JUL 3 1943

the OIL AND GAS JOURNAL

FLUOR DESIGNERS • ENGINEERS • CONSTRUCTORS

THE FLUOR CORPORATION, LTD., 2500 SOUTH ATLANTIC BLVD., LOS ANGELES 22, CALIF • NEW YORK • PITTSBURGH • KANSAS CITY • HOUSTON

SINCE 1890

PRICE 20 CENTS

JULY 1, 1943

EMCO ORIFICE METERS

Manifold of EMCO meters, gas lift header service, in California

EMCO Orifice Meters at repressuring station in Texas

EMCO Orifice Meters on absorbers and stills in Southwest plant

New Mexico natural gasoline plant EMCO equipp

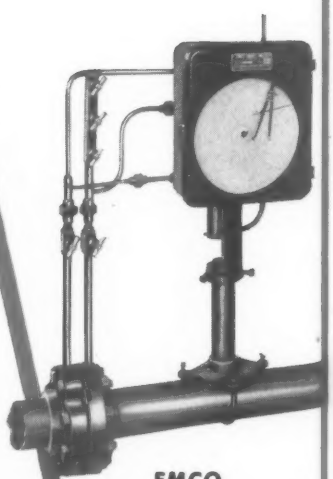
California "trap farm" equipped with EMCO Orifice Meters

for . . .

ACCURATE TROUBLE-FREE LARGE VOLUME MEASUREMENT

THE many features built into the EMCO Orifice Meter produce a meter that meets the approval of not only those responsible for measurement, but also those whose duty it is to keep measurement maintenance at a minimum and performance at a maximum.

The paramount consideration has been to provide a meter quickly accessible for adjustment and calibration, yet ruggedly constructed to assure a long life with a minimum of attention.



EMCO ORIFICE METE

INVEST TODAY IN BONDS FOR VICTORY

PITTSBURGH EQUITABLE

Meter Company

Science Lib
Wahs

The OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

Copyright 1943, by The Petroleum Publishing Co.

Vol. 42, No. 8 July 1, 1943

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — H. STANLEY NORMAN, *News Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refinery Editor*

W. L. NELSON, *Technical Editor* — W. V. HOWARD, Ph.D., *Field Editor*

HARRY F. SIMONS
Production Engineering Editor

Associate Editors

LYNN M. NICHOLS — PAUL REED
NEIL WILLIAMS

District Editors

JAMES McINTYRE, Tulsa 1, *211 S. Cheyenne Ave.* — CARL HOOT, Tulsa 1, *211 S. Cheyenne Ave.*

THOMAS F. SMILEY, Houston 2, *Sterling Bldg.* — E. H. SHORT, JR., Houston 2, *Sterling Bldg.*

L. P. STOCKMAN, Los Angeles 14, *Union Oil Bldg.* — HARRY F. SIMONS, Fort Worth 3, *Petroleum Bldg.*

HENRY D. RALPH, Washington 4, *Natl. Press Bldg.* — TOLBERT R. INGRAM, Denver 2, *State Office Bldg.*

O. C. PRESSPRICH, Saginaw, *News Bldg.* — J. P. O'DONNELL, New York 17, *415 Lexington Ave.*

VICTOR LAURISTON, Chatham, Ont., *35 Stanley Ave.* — A. C. MacINTYRE, Oil City, *Derrick Bldg.*

Advertising

E. KLAPPENBACH, *Vice President*

KENNETH J. LANGLEY, *Eastern Manager*, New York 17, *415 Lexington Ave.* — HOWARD MARKT, *Cleveland Manager*, Cleveland 14, *Leader Bldg.*

C. R. FARMER, *Chicago Manager*, Chicago 2, *105 W. Madison* — J. HOWARD TINKHAM, *California Manager*, Los Angeles 15, *1400 S. Grand Ave.*

WAYNE RIVES, *Gulf Coast Manager*, Houston 2, *Sterling Bldg.* — A. J. CHAMBERS, Twickenham (*Middlesex*) *England*, *72 Cole Park Road*

MITCHELL TUCKER, *Manager, Research Dept.*, Tulsa 1, *211 S. Cheyenne Ave.* — JOHN D. REILLY, *Production Manager*, Tulsa 1, *211 S. Cheyenne Ave.*

Member
Audit Bureau of Circulations
Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Army Promises Closer Coordination in Supply Procurement .. 14
High Strategists Consider Oil Price 15
Tubular-Goods Depots to Be Functioning in August 16
Procedure Established for Uprating Supply Orders 16
Compact Told Storage or Imports Must Supply Shortage 18
Hold-the-Linists Dominate OPA 20
New Elk Hills Plan Sought as Congress Intensifies Probe 22
National Limitation Placed on Fuel Oil 22
The Journal Presents New Series on Oil-Well Pumping 23
Higher Prices, More Lines Solution to Oil Dilemma 24
Penn Grade Association Repudiates Government-Subsidy Proposals 26
Deaths 28

Trends 13
This Week 17
Editorial 21
Federal Order Digest 25
Natural-Gas News 60
Natural-Gasoline News .. 60
Refining News 62
Pipe-Line News 65

ENGINEERING—OPERATING

Oil-Well Pumping Practices 29
Combination Gas Lift and Repressuring Plant in Payton Pool 32
Bottoms from Rerun Pressure Distillate Converted to Industrial Oils 40
Completion Records Aid Conservation of Strategic Materials 46
Plastics From Petroleum 49
Plant Modifications to Make Aviation Gasoline 50

Questions on Technology . 31
Pipe-Line Suggestions ... 36
Plant Practices 39
Cost Engineering 53
Eng. Fundamentals 55
Journalog 57

EXPLORATION AND DRILLING

Week's Highlights 69
Completions in All Fields 69
Daily Average Production for Week 70
Reports by Areas Start on Page 70

ADDITIONAL FEATURES

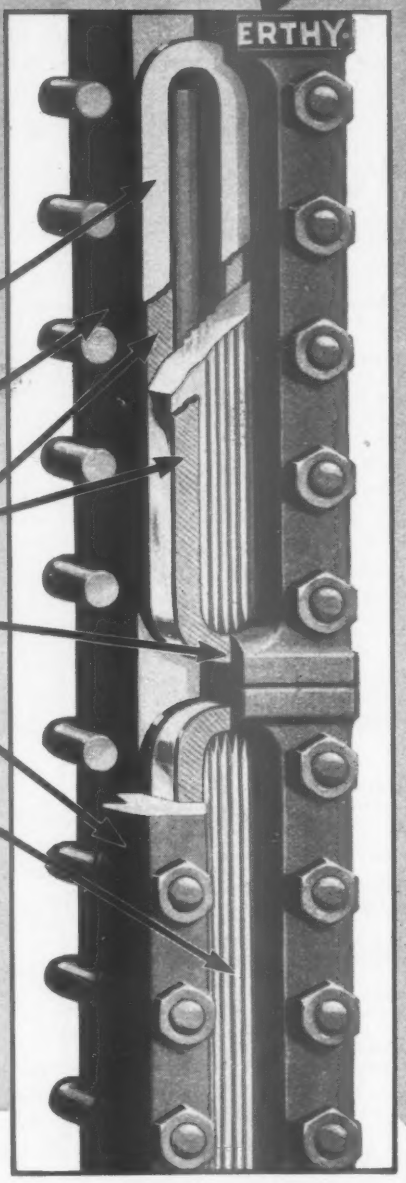
Drilling Contractors 84
Personals 86
Market Developments ... 88
Refinery Prices 89
Tank-Wagon Prices 89
Equipment Progress 91
Classified Advertising ... 93
Calendar of Events 96
Journalisms 96
Advertisers' Index 96

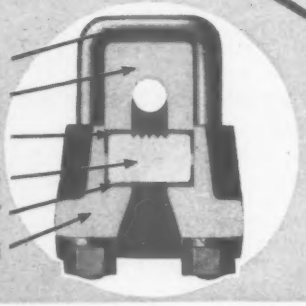
Points of Superiority

PENBERTHY

DROP-FORGED STEEL *Reflex* LIQUID LEVEL GAGES

- **GASKET GLAND** machined integral with liquid chamber fits snugly into glass chamber of frame preventing gasket blow-out.
- **LIQUID CHAMBER** alloy temperature resisting steel, heat treated, accurately machined and ground. Multiple section made in one piece.
- **GASKETS** are interchangeable and provide adequate and equal resilience on both sides of glass.
- **GLASS CHAMBER** in frame machined to contour of glass providing full metal backing for gaskets.
- **FRAME** drop-forged alloy temperature resisting steel with extra heavy beam at each end.
- **PYREX GLASS** has proved its greater strength and resistance to thermal shock and erosion.





PENBERTHY PRODUCTS

These Penberthy Drop-Forged Steel Reflex Liquid Level Gages are recommended for pressures up to 3000 lbs. per sq. in. at 100° F. and 1000 lbs. at 1000° F. They are provided in whatever lengths required and for various kinds of liquids. We shall be glad to quote upon your requirements.

Write for New Catalog No. 34-A

EMPTY SPACE SHOWS
WHITE
•
LIQUID SHOWS
BLACK

PENBERTHY INJECTOR COMPANY

Manufacturers of QUALITY PRODUCTS *Since 1886*
DETROIT, MICHIGAN • *Canadian Plant,* Windsor, Ont.

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States — Page 70

CRUDE PRODUCTION 3,975,085 bbl. daily average—down 15,520 bbl. One year ago 3,743,190 bbl.

CRUDE STOCKS 243,516,000 bbl. as of June 19—down 1,204,000 bbl. One year ago 252,748,000 bbl.

GASOLINE STOCKS 79,806,000 bbl. as of June 19—down 1,308,000 bbl. One year ago 89,693,000 bbl.

RESIDUAL FUEL-OIL STOCKS 67,455,000 bbl. as of June 19—down 197,000. One year ago 78,934,000 bbl.

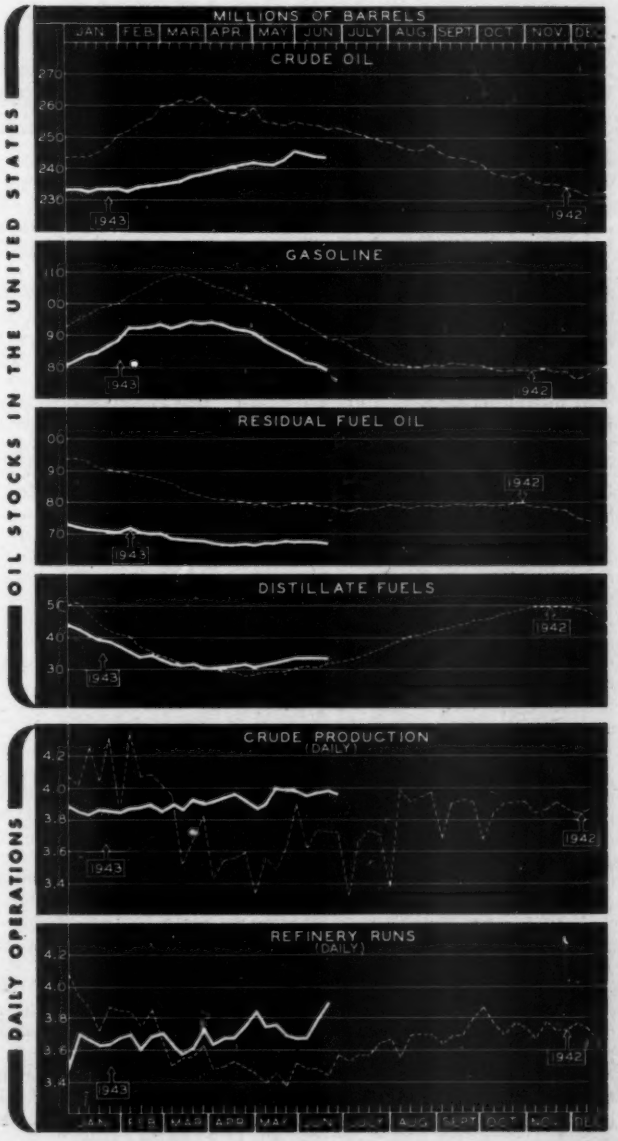
GAS OIL AND DISTILLATES 33,558,000 bbl. as of June 19—up 3,000. One year ago 31,477,000 bbl.

REFINERY RUNS 3,905,000 bbl. daily week ended June 19—up 106,000. One year ago 3,450,000 bbl.

AS revealed in the tabular data and charts on this page, the petroleum industry fell short in many of its objectives for the first 6 months of the year which ended Wednesday. With a 3 per cent increase in domestic crude-oil production the industry was able to add approximately 10 million barrels to its stocks of raw materials. The increases were scattered in several producing and refining areas. The gains still left crude stocks 8½ million barrels under the levels of a year ago. Crude runs to stills for the 6-month period were about 5 per cent ahead of the same period last year with all of the gains accounted for in May and June operations this year. The objective in these refinery operations, as announced early in the year, was to take care of the current demands including seasonal changes in stocks with sufficient excess production to build up stronger inventories by the end of the 6 months.

THE reports on this page show that the plan to improve the inventory situation in the principal refinery products was not accomplished. Stocks of gas oil and distillate are slightly higher than they were a year ago but the inventories of gasoline, residual fuel oils and kerosene are approximately 24 million barrels under a year ago. In the case of gasoline this stock situation becomes more important when the data for California are separated from the national totals, revealing that a large part of the decline is accounted for in the critical eastern areas.

IN retrospect it is apparent that crude-oil production and refinery operations the first 6 months should have been 5 or more per cent greater than they were. This conclusion is made with the knowledge that the actual operations followed quite closely the recommendations of the Government from month to month so far as national totals are concerned. In this connection a study of what happened the first half year also reveals that actual demands were in excess of the projected requirements. This was particularly true in the case of gasoline during the second quarter. Civilian demands with national rationing during that period were 5 to 10 per cent greater than had been anticipated by many companies and the military shipments were also greater. It is pointed out by those closest to operations that the half year left the industry with very little backlog in refinery inventories which means that demands for the last 6 months including seasonal accumulations will have to be supplied largely from current runs.



Army Promises Closer Coordination in Procurement of Oil Supplies

by Henry D. Ralph

This summary of how the War Department's new Fuel and Lubricants Division is being organized, the background of officers who will direct most of the future petroleum procurement and other details are of vital importance to the petroleum industry. Pertinence of the new division is enhanced by the disclosure that Army Service Forces will be buying about 1,000,000 bbl. of oil a day during remainder of the year.

WASHINGTON, D. C.—Much closer relations between the oil industry and the Army are promised by Col. William E. R. Covell, chief of the War Department's new Fuel and Lubricants Division.

"If the problem concerns oil and the Army, come to us," is Colonel Covell's standing invitation to the industry.

To fulfill this promise he is setting up an organization competent to deal promptly and effectively with all petroleum problems of the Army Service Forces. Outside his jurisdiction are the Army Air Forces and the Navy, but machinery for coordinating the three is being revamped and strengthened so that all oil procurement for the armed forces can be handled in a unified manner.

Previous Activity Divided

Up to now, military fuel purchasing has been spread out through the various branches of the armed services, but the job has grown so big that unified control is imperative. To indicate the size of the problem, the War Department has recently let it be known that oil constitutes two-thirds of the tonnage required to transport, land, and maintain an expeditionary force, including the fuel for the convoy and its escort and the airplane umbrella; that petroleum products constitute about half the total military tonnage now being shipped overseas, considering round-trip bunker fuel for the ships; and that during the balance of this year the Army Service Forces will be buying approximately 1,000,000 bbl. of petroleum products per day.

To handle this tremendous business efficiently, Lt. Gen. Brehon B. Somervell, commander of the Army Service Forces, created the Fuel and Lubricants Division within the Office of the Quartermaster General, and combined in it all the procurement functions of the engineers, artillery, and other branches of the Army with a few exceptions. The only important exception is fuel and lubricants for Army aircraft, procurement of which remains in the Army Air Forces, though the QMC buys the motor gasoline used by the A.A.F. Other exceptions are recoil oils for artillery, hydraulic fluids, lubricants and greases for special weapons, and cutting oils used by arsenals, but these specialty products are small in quantity compared with the bulk of the Army needs.

Already Colonel Covell has an organization of some 60 officers, assembled from various branches of the Army previously dealing with fuel procurement, and he is looking for a few more for top jobs. He has his eye on some experienced oil executives and hopes to get them to accept commissions for the duration.

"Everyone in my outfit is an oil expert except me," Colonel Covell boasts, and this is almost literally true. While some of the officers in the division devote their attention to coal and other fuels, almost all the rest either have been in the oil industry or have worked with Army oil-procurement problems for many years.

Experienced Personnel

But the oil industry need have no apprehension about the lack of experience on the part of the head of the division, for Colonel Covell is both a soldier and an executive. He was the honor graduate of the West Point class of 1915, an honor graduate of the Army's Command and General Staff School, holds a degree from Massachusetts Institute of Technology, is a registered professional engineer in the State of Pennsylvania, and is a member of the American Society of Civil Engineers. He served overseas in World War I, was in charge of maintenance at the Panama Canal, built flood-control works in Pennsylvania, and was assistant engineer commissioner of the District of Columbia. Several years ago he retired from the Army to enter business, and was general manager of the Crossett-Arkansas companies dealing in lumber, paper, and chemicals.

"One thing I learned in business," he says, "is that an industry has to have knowledge of probable demands in order to balance its production operations. I realize that the oil industry can't supply unlimited quantities of petroleum products at any place in the country without advance notice, and part of our job is to see that the industry gets the information it needs to meet the requirements of the armed forces."

It is no secret that Colonel Covell will be made a brigadier general, as befits his job of director of the division, as soon as the necessary papers get through the mill.

Assistant director is Brig. Gen. Walter B. Pyron, well known to the oil industry as petroleum liaison officer on General Somervell's staff. He will continue this function but with addition duties, and will be in charge of planning, coordination, and liaison with industry and with other branches of the services.

Taylor Deputy Director

Deputy director is Lt. Col. Jay L. Taylor, a petroleum engineering graduate of the University of Oklahoma, vice president and general manager of the Halliburton Oil Well Cementing Co., a licensed air pilot, a Texas cattle raiser, and formerly chairman of the Federal Reserve Bank of Dallas. He entered the Army at the outbreak of the war, and is also slated for a promotion soon.

The Fuel and Lubricants Division has two functions. The first is the staff function at the headquarters level of doing all the planning related to oil for all the Army Service Forces, or of seeing that this work is properly done by some branch of the service. The second is the Quartermaster function of procurement, storage, and issue. This is the first time that these two functions have been combined, for previously both the procurement and the staff work were spread among several branches.

The division is divided into six branches: the Technical Branch, which

will deal chiefly with specifications and which hopes to secure uniform specifications for all branches of the Army, Navy, and British purchases here; the Planning Branch, which will develop broad, over-all plans for oil needs and procurement for the ASF (and for other branches of the armed forces if requested); the Requirements Branch, which translates the planning into detailed schedules; the Operations Branch, which handles the physical work of procurement, issue and storage; the Control Branch for coordination; and the Administrative Branch to handle personnel and office work.

Berlin Heads Technical Branch

The men who are heading these branches are rather well known in the oil business. For example, there is Col. E. W. Berlin, head of the Technical Branch. A petroleum engineering graduate of the University of California School of Mines, he was an Air Corps cadet in 1918 and has been a reserve officer since. He worked in the oil fields in Texas, Oklahoma and California, was sent to the Netherlands East Indies as a petroleum engineer, and was in charge of the Standard-Vacuum interests in that part of the world when war broke out. About a year ago he was commissioned a full colonel and was assigned to the Engineer Corps until the Fuel and Lubricants Division was formed.

Head of the Operations Branch is Col. Harold E. Rounds. He served 9 months as a seaman in the U. S. Navy and 2½ years as a private in the AEF during the last war, where he won a Distinguished Service Cross and other decorations. He holds degrees in chemical engineering from Tufts and Harvard, and in business administration from Harvard and New York University. He has engaged in several different business enterprises and was a large buyer of paraffin and crude as general manager of the Columbia Wax Works.

Oil and Army are also mixed in the career of Lt. Col. Frank E. Wilder, head of the Requirements Branch. Graduating from the U. S. Military Academy at West Point in 1923, he served as a second lieutenant of infantry for 2½ years when he resigned to take a position in the foreign department of predecessors to Socony-Vacuum Oil Co. In 1938 he was sent to Vienna in charge of the Central European operations of Socony-Vacuum, and was an official of the Poland-Vacuum Oil Co., S.A., at the time of the German invasion in 1939. Escaping ahead of the Nazis, he returned to the United States and organized the plant-protection program of Socony-Vacuum until March 1942, when he was recalled to the Army and assigned to the Office of Undersecretary of War.

The heads of the other branches have not yet been announced, but a high berth will be found for Col. J. H. Leavell, formerly a Tulsa oil man, and recently connected with the Army-Navy Petroleum Board.

The new division will work closely with Col. D. G. Lingle, in charge of petroleum-products procurement for the Army Air Forces, and also with the Army-Navy Petroleum Board which will continue to function as in the past.

The Army-Navy Petroleum Board is composed of Lieutenant General Somervell (with Colonel Covell acting as his deputy), Vice Adm. F. J. Horne, Colonel Lingle, and Rear Adm. W. W. Smith.

The board reports directly to the joint chiefs of staff, and its function is to coordinate the petroleum requirements and procurement policies of the Army and Navy, and also those of the British armed forces and of the Lend-Lease Administration.

One of the first accomplishments of the new Fuel and Lubricants Division is the adoption of an "escalator clause" contract for all ASF purchases of petroleum products, permitting oil companies to enter long-term supply contracts without fear of market changes. Until now most Army oil supplies have been purchased on spot contracts as suppliers did not dare to make long-term commitments because of possible changes in costs and prices. The new contract form permits the price to go up or down in accordance with changes in ceiling prices set by the Office of Price Administration, changes in transportation rates, or other actual changes in costs.

High Strategists Consider Oil Price

WASHINGTON, D. C.—High strategy conferences regarding the future supply of oil for military requirements are being held currently under the auspices of James F. Byrnes, director of the Office of War Mobilization, with prospects that there may soon be a break in the deadlock over the price of crude.

Top Army and Navy officials have recently expressed public alarm over a possible inability of the industry to supply the huge quantities of oil needed by the armed forces. While PAW is known to be preparing recommendations for tighter rationing of gasoline in the Midwest and probably eventually the rest of the country with the exception of local areas.

PAW insists a crude price will increase production but OPA is still opposed though it is reliably reported willing to agree to some price premium for crude from newly discovered pools.

In addition to prices the current conferences cover Administrator Ickes' request for authority over oil rationing. WPB Chairman Nelson has disapproved but promised a new system for interagency cooperation with PAW having a bigger voice. Prospects are for early announcement of comprehensive plans for increasing crude production and curtailing non-essential gasoline consumption.

Acme Photo

Joseph Eastman, director of the Office of Defense Transportation, and Prentiss A. Brown, price chief, last week joined Petroleum Administrator Ickes in WPB-inspired conferences on coordinating eastern oil supplies, also discussed prices with OWM Director Byrnes

Tubular-Goods Depots To Be Functioning in August

WASHINGTON, D. C.—Prompt service on necessary tubular goods for emergency well completions after August was promised this week by the Petroleum Administration for War after completing arrangements for establishment of 10,000 tons of field stocks at 12 central depots.

PAW officials declared that operators qualifying for use of the emergency field supplies should be able to get pipe in 2 to 24 hours after the system is fully organized. The stocks will be maintained at approximately the 10,000-ton level by replacements in pace with drafts.

Established supply companies will carry the pipe in stock at each of the 12 depot locations. Operators will be permitted to order from the nearest supply house which can quickly communicate with the depot and start the pipe moving to the new well.

Steel mills will be instructed to keep 20,000 tons on hand, to meet emergency calls from any area, in addition to the 10,000 tons which will be distributed over the country among the various depots in amounts proportionate to the wildcat activity in each area.

Deliveries will not be made from these emergency stock piles unless the purchase is approved by the PAW district director of production in the wildcatter's district, but this approval may be obtained by telegraph. Sales must be in compliance with the general priority order covering the petroleum industry, but PAW said that this did not mean that any delay in delivery would result from formalities.

Towns in or near which the depots will be located and the quantity of tubular goods to be kept on hand are: Chase, Kans., 800 tons; Mount Pleasant, Mich., 400; Grayville, Ill., 500; Seminole, Okla., 500; Houston, Tex., 1,300; Corpus Christi, Tex., 800; Odessa, Tex., 700; Shreveport, La., 700; Wichita Falls, Tex., 600; Cut Bank, Mont., 400; Casper, Wyo., 600; and Los Angeles, Calif., 2,700 tons.

Plans to establish the emergency tubular-goods depots were announced by Administrator Harold L. Ickes last May. Object of the depots is to encourage wildcat drilling operations by meeting the need for minimum stocks of materials that will be available immediately when required for wildcat and emergency purposes.

Procedure Established for Uprating Supply Orders

CHICAGO.—Procedure for uprating equipment orders on which the original assigned rating was too low to secure delivery at the time required has been outlined for production operators. The necessary steps were outlined last week in a letter from Frank A. Watts, director of materials, Petroleum Administration for War, Washington, D. C. The procedure applies only to material which has not been shipped.

The procedure whereby such delivery orders can be uprated to AA-2X is as follows:

In the case of delivery orders "where total cost to the operator of all items on the delivery order is $1,000 or more, or where the cost to the operator of any item on the delivery order is $500 or more" the production operator shall submit the already approved copy of his delivery order to the district office of PAW in the district where the material is to be used.

If the operator has already filed and secured an approval to the PD-873 application for the calendar quarter in which the equipment in question is required and has made mention on such form, of the program in which the equipment is to be used and has noted the serial number of the PD-873 certificate on his delivery order, the district director may, if he considers the equipment on the delivery order essential to the war program, affix the new countersignature stamp on the delivery order, assign the AA-2X rating, countersign same and return the delivery order to the operator.

If the operator has not filed a PD-873 application for the calendar quarter in question he may accompany the delivery orders which should be uprated with a PD-873 application properly filled in and in such case the uprating of the delivery order and the processing of the PD-873 application can be done simultaneously at the district office.

These instructions on how to obtain upratings on production-equipment orders give added evidence of the increasing efforts to make essential supplies available to the petroleum industry. This outline of procedure explains how orders may be uprated to the level of AA-2X, if the operator has filed his PD-873.

New Rating Retroactive

After receiving his uprated delivery order the operator is then at liberty to notify his supplier by letter or by corrected delivery order, of the new rating that has been approved, requesting the supplier to correct the original copy of the delivery order accordingly and to schedule delivery in accordance with the new rating. The supplier should also be reminded that according to Interpretation 1 of CMP Regulation 3, the "rerating takes effect as if the new rating had been applied or extended when the original rating was applied or extended."

In the case of delivery orders where the cost to the operator of all items on the delivery order is less than $1,000 and the cost of every item on the delivery order is less than $500, the operator may uprate his delivery order and notify his supplier as outlined above, without first securing approval from the district office of the PAW, provided, however, that he has, prior to the uprating of his delivery order, filed and secured approval to a PD-873 application covering the calendar quarter in which the equipment in question is required and has made mention on such form of the program in which the equipment is to be used. In such case, the operator, to complete his records, should note the PD-873 serial number on each delivery order that is so uprated.

No operator may uprate a delivery order and in no event may a district office approve a request to uprate a delivery order unless a PD-873 has been filed and the operation for which the material in question is to be used has been authorized as an approved production operation on Schedule A of the form and a rating assigned therefor.

THIS WEEK

PRICES—High administration strategists conferring regularly on higher crude ceilings. . . . Ranking military authorities expressing first public concern over supply outlook, may throw weight behind drive for advance. . . . OPA softening to extent of accepting a policy of premiums for newly discovered oil. . . . ¶Industry cites economic necessity of lifting entire price structure, meaning more money for current production, to stimulate outlay of venture capital. . . . ¶General theory of subsidies as production stimulants rejected by Congress. . . .

SUPPLIES—Army Service Forces reveal military requirements of 1,000,000 bbl. daily, for remainder of year. . . . ¶PAW assistant deputy administrator warns of 400,000 bbl. per day shortage in third quarter. . . . WHICH must be met either by liquidating storage, or by imports. . . . Essential requirements next 90 days calculated by PAW at 4,750,000 bbl. daily, for all petroleum liquids. . . . Productive capacity calculated at 4,360,000 bbl. . . . Current national production quota is 4,328,000 bbl., leaving margin of 32,000. . . . ¶Administrator Ickes certifies 328,000 bbl. daily of automotive fuel available for essential consumption on East Coast, in July. . . .

REFINING—Another aviation - gasoline plant, another synthetic-rubber unit start production. . . . Emphasis given to greatly expanded manufacturing capacity, scheduled for weekly growth, between now and December. . . . ¶Higher commitments made by Government's DPC to Ashland Oil & Refining Co., and Harrison-Abercrombie Co., for expansion of war-products facilities. . . .

TRANSPORTATION—Negotiations underway for weaving Atlas line into WEP supply system, drawing on North Louisiana crude supplies. . . . ¶New peak of 320,000 bbl. cleared in one 24-hour period by WEP's Norris City terminal. . . . ¶Tank-car deliveries to East Coast skid slightly, averaging 962,056 bbl. daily. . . . Mid-June deliveries to eastern states, by all substitute methods, averaged 1,405,909 bbl., against 1,029,899 a year earlier and 100,000 bbl., before the war. . . . Railroad Commission Chairman Jester recommends two additional big-inch lines from West Texas, one to California, the other to Minneapolis or Chicago. . . .

PRODUCTION—War Department reports currently developed production at Canol project, Northwest Territory of Canada, is in pace with objectives. . . . Confirms construction of 600-mile line from Fort Norman wells to Whitehorse. . . . Details withheld as of vital military importance. . . . Northwest Territory now producing nearly 600 bbl. daily. . . . ¶Gas showing on south flank of granite high in Pecos County, believed in Pennsylvanian, enhances general West Texas outlook. . . .

EQUIPMENT—PAW designates 12 depots for emergency field stocks of tubular goods. . . . Expects system to be functioning by August, giving exploratory-well operators immediate access to necessary pipe. . . . ¶Refiners urged to place orders immediately for MRO replacements of carbon molybdenum and alloy still tubes. . . .

DRILLING—Present rate of exploratory drilling, if projected for entire year, will fall more than 1,200 wells short of PAW goal of 4,500. . . . ¶Independents tell House naval affairs subcommittee that low price is chief deterrent. . . .

The WEP big-inch line taking one of its almost vertical rises in the Allegheny Mountains as construction on the eastern extension nears completion. Final pipe shipments left the supplying mill this week

Compact Told Storage or Imports Must Supply 400,000 Bbl. Daily Shortage

by J. P. O'Donnell

PITTSBURGH, Pa. — The fact that current and impending developments threaten the capacity of this country to produce oil was strongly emphasized in addresses here last week before the quarterly meeting of the Interstate Compact Commission. The principal current factor is the persistent refusal of the OPA to permit a price that will stimulate sorely needed exploratory operations and the impending factor is a demand which, according to Dr. R. E. Wilson, president of Pan American Petroleum & Transport Co., might require wells "to be produced at a rate which would actually dissipate part of the underground reserves on which this nation must rely."

These viewpoints were recognized by the commission itself in resolutions which were adopted at the close of the session. The first of these resolutions called for determination by the various states of their optimum production rates, an agreement that these rates would not be exceeded except for immediate military demands, the supplementing of domestic sources by others to preserve existing reserves and the supplying of these optimum production rates to the Government for use in a world-wide program. The second called to the attention of Congress the fact that present conservation measures are in jeopardy as a result of the lack of wildcat drilling and pressed for an increase in the price of crude oil and petroleum products.

Robert E. Allen, assistant deputy petroleum administrator for war, indicated the seriousness of the domestic situation when he said that estimated total crude-oil requirements for the third quarter amount to 4,750,000 bbl. daily in comparison to the June allocations of 4,328,000 and the estimated supply available in this country of 4,360,000 bbl. This leaves us 400,000 bbl. short, he said, an amount which will have to be made up by withdrawals from storage, further restrictions on the civilian economy or resort to other sources of supply such as South America and the Middle East.

Mr. Allen also discussed the motor-fuel situation which is equally critical at the moment. He gave figures showing that available supplies of gasoline in the third quarter for the country as a whole will be but 94 per cent of minimum essential requirements as represented by the various claimant agencies and emphasized this with the comment that consumption is still well in excess of these requirements. Therefore, curtailment of more than 6 per cent is necessary to bring demand in line with supplies. This indicated percentage of supplies of motor fuel available to each district in the third quarter was given as follows: District 1, 83 per cent; District 2, 106 per cent; District 3, 107 per cent; District 4, 108 per cent; District 5, 91 per cent.

Minimum essential gasoline requirements for the country as a whole in this quarter are expected to be 1,550,000 bbl. daily and the indicated supply will be but 1,450,000 bbl., Mr. Allen said. He said that District 1's position will be the worst with indicated minimum requirements of 567,000 bbl. daily and supplies of only 469,000 bbl. As an example of the influence of excess consumption, he cited the situation in District 2 where the indicated requirements are 505,000 bbl. daily and the supply, 535,000 bbl., which indicates a surplus of 30,000 bbl. Actually excess consumption in District 2 amounts to 60,000 bbl. daily, so that in reality there is an indicated shortage, on the basis of total present consumption, of 30,000 bbl. per day.

In discussing demand, Dr. Wilson, in the opening address, said: "It is already apparent that if the war continues, the military demand for petroleum and its products will continue to increase during 1944 as it has in 1942 and 1943. Since most of our civilian consumption is near rock bottom, it is obvious that if much of this increased military demand is to come from this country our refining facilities and particularly our crude-producing ability will be under a heavy strain during 1944, and that all possible steps will have to be taken to increase crude production and transportation from areas where production is available to areas where it is needed."

He said it is no secret that "under present conditions close to a quarter of the total petroleum products produced in this country are going into military channels."

Dr. Wilson suggested increasing production where economic to counteract the "unwise" decline in crude stocks. "I fully appreciate," he said, "that in normal times the right place to keep crude stocks is in the ground where waste is at a minimum but since we are looking ahead to a period of probable shortage where crude may have to be produced in certain fields at rates in excess of the effi-

Gov. Andrew F. Schoeppel, chairman of the compact, welcomes Charles H. Jones, director of the Department of Commerce of Ohio, as that state's representative on the commission

cient rate of production, it would seem much sounder to permit those fields which are now held down to less than their maximum efficient rates, and which are connected to adequate storage or refineries with adequate outlets, to raise their output promptly to this efficient rate or to the limits of available storage. This would minimize the decrease in aboveground storage and help to postpone the deplorable day when, to meet emergency demands, wells might have to be produced at a rate which would actually dissipate part of the underground reserves on which the nation must rely."

Caribbean Supply Available

As an alternative source of supply, he referred to the Caribbean area, Venezuelan crude and the Dutch West Indies refineries. "It is true," he said, "that these locations involve a somewhat longer haul by tanker than from our East Coast, but considering the fact that all the oil lifted from the East Coast must be transported from the Gulf by high-cost transportation methods, it would seem that the most efficient method of taking care of the war requirements would involve taking an increasing proportion from these sources, especially as the tanker-building program is now making rapid progress. This is particularly true since the supply of residual fuel oil is especially critical and most Venezuelan crudes give a large yield of this product. Basing a world-supply program on what happens to give by a small margin the shortest tanker haul is certainly not a proper approach to this important and very complicated problem."

Dr. Wilson foresaw a better situation on the East Coast this winter due to the mere existence of "more transportation to the East Coast than was available in normal times. It gives that area much better protection against unexpected emergencies than it had last winter, as in a case of real emergency, tankers could, in a short time, haul more of the military requirements from the Gulf and Caribbean areas in order to leave more of the current shipments available for civilian use on the East Coast. While this should not be counted on except in real emergency, it is possible that our growing tanker supply or a slackening of military demand during the winter months might make such a diversion possible."

The main problem of District 2 is an adequate crude supply, Dr. Wilson said, and this might by itself necessitate some tighter rationing in this district, especially if additional product is to be moved into District 1.

While District 3's problem had been disposal of nonwar products from war-products refineries, protection of reserves is now its principal concern. "Texas," he said, "has the largest stake in avoiding dissipation of its treasured reserves by excessive production rates and should insist that all reasonable alternatives be carefully considered before this is done."

District 4 is more or less self-contained but District 5 has the problem of getting adequate crude production and here again, Dr. Wilson found, "careful study should be made to see if part of the increasing demands which are indicated as being required from the Pacific Coast could not be more efficiently supplied from other parts of the world."

Dr. Alexander Sachs, adviser to the PIWC committee on economics, said that the oil industry enjoys an enviable position "in contrast with other industries, though it is one of the most vital and essential in the war economy, it is still uninflated while the others are greatly affected. Oil's position is unique since in neither volume nor price has it been greatly affected and therefore its postwar readjustment will be easier than other industries which must go through a reconversion." While it took other industries 1½ years to convert to war production and it will require probably as long for reconversion, oil will have a pent-up civilian consumption so great that it will absorb the productive capacity of the war.

B. H. Weil, Gulf Research & Development Co., Pittsburgh, Pa., reported on petroleum substitutes and the oil shortage. He listed four methods which deserve the most attention: (1) Production of shale oil from oil shales. (2) Hydrogenation of carbon monoxide (Fischer - Tropsch synthesis). (3) Hydrogenation of coal. (4) Blending of hydrocarbon fuels with alcohol made from agricultural products.

Dr. Alexander Sachs, adviser to the PIWC economics committee, and John D. Gill, a director of Atlantic Refining Co. and chairman of PIWC's subcommittee on cost and price adjustment, who addressed the compact meeting

An analysis of the conflicting forces which have precipitated an impasse in the crude-price situation as presented before the compact meeting appears on the following page. In it, John D. Gill, chairman of the study group of the PIWC committee on Cost and Price Adjustment and a director of Atlantic Refining Co., shows that the industry's ability to satisfy demand for petroleum without waste is a secondary consideration in the eyes of OPA.

Mr. Weil estimated costs of producing gasoline by the last three methods as follows: (1) Fischer-Tropsch gasoline, from coal—18 cents per gallon; from natural gas—9 to 12 cents per gallon. (2) Coal hydrogenation, 15 cents per gallon with a far-distant potentiality of 12 cents. (3) Ten per cent alcohol-blend gasoline (based on alcohol at 40 cents per gallon), 10 cents.

Production Costs Cited

Giving more detailed consideration to oil shales, he said, "American reserves are estimated at 400,000,000,000 tons, capable of yielding over 100,000,000,000 bbl. of shale oil which in turn might yield up to 60,000,000,000 bbl. of gasoline. Most authorities seem to agree that shale oils can be produced, even by older techniques, at costs not exceeding $2 per barrel and that gasolines of comparable specifications to those used today can be produced at costs in the vicinity of 5 to 12 cents per gallon. Modern petroleum technology would seem to indicate that such figures might be sustained in actual practice."

Reports by the research and coordinating committee, headed by Dan C. Howard, and the legal committee, headed by Earl Foster, were presented.

At the invitation of Hiram Dow of New Mexico it was decided to hold the next meeting of the commission at Santa Fe.

Hold-the-Linists Dominate OPA

by John D. Gill

These extracts taken from the address of John D. Gill before last week's meeting of the Interstate Oil Compact Commission at Pittsburgh, Pa., present the basic issues involved in the current struggle for higher price ceilings.

TRUE realists and true conservationists deal not only with the facts of the past and the present moment, but also with the probabilities of the future. The probabilities have been forecast by the long-experienced and competent personnel of the crude-oil-price study group of the Cost and Price Adjustment Committee of the Petroleum Industry War Council, and by the crude-oil production specialists of the Office of the Petroleum Administration for War. Their main conclusions may be expressed briefly, as follows:

1. In the near future the demand for petroleum will exceed the currently available maximum efficient supply, necessitating resort to wasteful production;

2. Because of increases in virtually all of the items of cost in the search for and development of reserves, and especially because of the increasing effort required to achieve any given volume of discovery, the capital costs of crude-oil properties and the operating costs of producing crude yet to be discovered will be measurably higher than the costs that attach to the reserves heretofore discovered and developed.

Complacency an Obsession

But the probabilities cannot be proved. The Office of Price Administration does not consider them inherently factual. Therefore, they are of little concern to that agency. Complacency continues to obsess its mind.

The chief reason for the price-control agency's negation of the industry's claim for an upward adjustment in ceiling prices may grow out of the fact that it is the servant of two masters, and like the servant of the biblical parable, must cleave to one and despise the other. The two masters are respectively: first, the hold-the-line policy of the executive branch of the federal Government; and, second, volumes of production necessary to the highest welfare of the nation. Its price policies must serve both masters. The price agency appears to be very much more concerned about the effect of an increase in the price of petroleum upon the hold-the-line policy than upon the industry's ability to satisfy, without waste, all demands upon it, or upon the financial status of producers who are forced now to produce oil for prices which will not yield replacement costs.

The hold-the-line policy, therefore, becomes the primary master and the volume of production to satisfy demand the secondary one. But this is not to say that in its disregard for this secondary master, the agency in charge of price control would openly sponsor, or even indifferently acquiesce to the wasteful production of properties. No doubt that agency would exercise itself to avoid such imputation. But if the committee of the PIWC and the experts of PAW are right in their judgment regarding the imminence of a shortage of supply, an issue may be created which the Office of Price Administration cannot long ignore. Either crude oil must be wastefully produced in order to satisfy total demand, or total demand must be further reduced for the purpose of holding the line.

If the deprivation of civilians were the only course open for the most vigorous prosecution of the war, there would, of course, be no issue. But the severe restriction of civilian consumption in nearly all parts of the country should be unnecessary; restriction operates to increase the inflationary gap, so abhorrent to the price administration; and in a significant way does violence to the principles of conservation broadly interpreted in terms of the welfare of the people.

Now it well might be that the impacts of the war, which brought about a reduction in the usually employed oil-transportation facilities available to the eastern section of the United States; and the loss, for the time being, of our accustomed source of rubber, might have forced a rigorous restriction in the use of gasoline in that area. But the loss of transportation had little, and the loss of our rubber supply had nothing directly to do with the restrictions in the consumption of that fraction of crude petroleum which ordinarily is employed for the heating of homes and other peopled buildings. For the year 1943 the normal expected demand for oils for this purpose totals 238 million barrels. But it appears now that the avails will be more than 69 million barrels, or 29 per cent short of the requirements.

From even this brief statement it must be clear that just as "price" is intimately related to the conservation of petroleum, so it is related to conservation in the broad sense of the term. Price determines the character and extent of use and of the competition of other commodities. It also determines the amount of effort which may be expended in the search for reserves, for production therefrom, for transportation and refining. Price always has been the factor which equated supply and demand. In peacetime, price has been a variable moving to any level necessary to perform its equalizing function. But at present the cart and horse are reversed. Price is no longer the free-moving variable to equate supply and demand, but is a constant to restrict the supply to a preconceived total of demand. This is a condition unfortunate for civilians hungry for petroleum products, but it is the case.

Essentiality Overlooked

If federal control of prices were concerned only with the maximum wartime production of goods in order of their essentiality, there is no doubt that in the light of diminishing discoveries of new reserves for any given volume of exploratory effort, and in further view of the imminence of a shortage of supply, the price-control agency would long ago have accorded a general increase in the prices of crude petroleums and their products.

But it is conceded that from the viewpoint of the hold-the-linists, the problem of the prices of crude petroleum should not be considered apart from its relations to the price problems of other elements of the economy. The impact of changes in one set of commodity prices upon the costs of many other commodities, and hence upon many other prices, is too well understood to need restating here. However, when the control of the prices of a natural resource like

(Continued on Page 23)

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Presenting the Facts

THE meetings at Pittsburgh, the naval subcommittee hearings and statements from Washington and elsewhere were the week's contributions to the seemingly inexhaustible discussion of "what's wrong with oil".

Public interest was reflected in the reports of the meeting carried in the press and on the air throughout the entire country. Anything that has a bearing on the quantity of gasoline available at the corner service station and the prospects for oil-fuel supplies this winter is of increasing importance to tens of millions of Americans.

But we still wonder if the Joneses and the Smiths, from the abbreviated press and radio reports, have had much added to the sum total of their knowledge as regards oil. The headlines vary from feast to famines as to future oil supplies, dependent on who has the floor and the interpretations made of the latest information available.

For example, much has been made, newswise, of an official Texas statement that the Lone Star State could produce several hundred thousand barrels daily additional crude oil and continue to comply with conservation regulations. The civilian assumption is that shortages are artifically created.

No one will dispute the statement as to the additional crude oil available from Texas fields although there will be disagreements as to how long the enlarged production could be maintained.

Conceding the additional productivity there are still several questions to be answered. Is there pipeline capacity to take the crude oil to points where it is needed and where there is plant capacity not now being utilized? Is the quality of crude oil such that it can be used in refineries making war products? After the raw material is refined, what about the transportation of the finished products?

What these questions reflect is that an additional barrel of crude oil at the well doesn't mean anything unless it can be translated into terms of finished products delivered to civilians, or war products at terminals ready for overseas shipment. Because of this war fact it is futile to talk about domestic supplies much above present levels until transportation and manufacturing problems are solved. The remedies for this situation should have been under way more than a year ago.

On the demand side the consuming public would like to know about the possibilities of a more equitable and effective gasoline-rationing procedure. Then there are the military demands, new estimates of which represent large increases over anything that has been indicated in the past. If these estimates are correct civilians generally will have to contribute to the pool from their present depleted supplies. A comprehensive explanation of why these estimates are coming through at this late date would be of interest to consumers.

As suggested by Dr. Wilson at Pittsburgh, more thought should be given to a world program in the present efforts to balance oil supplies and demands. This also hinges on water transportation concerning which there has never been a clear statement of fact on which producers and users could rely.

The consumer believes he is entitled to accurate information as to actual conditions. If he has it he will be helpful in getting the needed price, materials and manpower required for immediate and long-range remedies. Nothing is more vital to civilian morale in support of the entire war program.

Intangible Drilling Cost Revision Gives Alternate Privileges

WASHINGTON, D. C.—A general revision of income-tax regulations relating to intangible drilling costs was issued by the Bureau of Internal Revenue as T.D. 5276 on June 28.

While highly technical, the revision provides more liberal tax-accounting treatment of charges to capital and to expense of the cost of developing oil and gas wells, and grants a new option which operators may elect to use for the current and subsequent tax years.

Jury Acquits Cosden Officials Of "Hot Oil" Charge

DALLAS, Tex.—Cosden Petroleum Corp. and three individual defendants were acquitted in federal court here last week in the trial on charges of conspiracy to violate the Connally Hot-Oil Act. The individual defendants were Raymond L. Tollett, president of the company; R. Weldon Thompson, pipe-line superintendent, and M. M. Hines, an employe.

DPC Commitment With Ashland Raised $2,500,000

ASHLAND, Ky.—An increase of $2,500,000 to provide additional facilities at Ashland Oil & Refining Co.'s refinery was announced here last week by the Defense Plant Corp., subsidiary of the Reconstruction Finance Corp. The new authorization raises DPC's commitment in the contract with Ashland to approximately $9,200,000.

Ashland Oil & Refining Co. will operate the facilities covered by the $9,200,000 expenditure, title remaining in DPC.

Two-Year Extension of Cole Pipe-Line Act Expected

WASHINGTON, D. C.—The Senate is expected to approve this week a bill already passed by the House to extend for 2 years the Cole Pipe-Line Act which expires July 1. The act authorizes the president to issue proclamations permitting oil pipe lines to condemn rights-of-way.

George Wilson, PAW transportation attorney, told the Senate committee on interstate commerce June 28 that PAW has no plans for additional pipe lines in the immediate future but that the bill is necessary to permit quick extensions in times of emergency.

Tariff Commission Issues Supplemental Reports

WASHINGTON, D. C.—The U. S. Tariff Commission, for the Office of Price Administration, has prepared two supplemental reports on the cost of producing crude petroleum in the United States. Whereas the original report, dated December 1942, covered all the principal producing pools or fields and many of lesser importance, each of the supplemental reports is more limited in scope. One report includes data for 16 selected pools or fields located in 11 states east of California—2 states in the Rocky Mountain area, 7 states in the Mid-Continent-Gulf Coast area, together with Illinois and Michigan. The other report covers 24 pools in California, of which 20 produce chiefly the heavier grades of oil. For these 20 pools, the report shows costs separately for the heavier grades. Both reports present data for the calendar years 1939, 1940, and 1941, the four quarters of 1941, the first and second quarters of 1942, and the month of July 1942.

These reports are now ready for distribution in limited quantities.

National Limitation Placed on Fuel Oil

WASHINGTON, D. C.—Delivery of fuel oil anywhere in the United States is limited by Petroleum Distribution Order 13 issued June 30 by the Petroleum Administration for War.

The order replaces War Production Board Order L.-56 with three changes: extension to the entire country, prohibition against the use of fuel oil for weed control, and permission to use fuel oil in new space heaters acquired under Ration Order 9 of the Office of Price Administration. In the 14 states brought under the limitation for the first time delivery of fuel oil is prohibited for use in new burners or those converted from the use of other fuels after July 22.

Carter Oil Co. Adopts 44-Hour Work Week

Carter Oil Co., Tulsa, announced this week that beginning July 1 the office personnel in Tulsa is on a 44-hour week, an increase of 4 hours. Under the new schedule the office employes will work five 8-hour days and a half day Saturday. This is the third Tulsa oil firm to increase the length of the work week for office employes, Stanolind Oil & Gas Co. and Shell Oil Co., Inc., having previously gone to 48 and 44 hours, respectively.

New Elk Hills Plan Sought as Congress Intensifies Probes

WASHINGTON, D. C.—A new plan for development of the Naval Petroleum Reserve 1 at Elk Hills, California, is being sought by the Navy Department following cancellation of the contract of November 20, 1942, with Standard Oil Co. of California, but Congress apparently intends to conduct a thorough investigation of the entire affair.

What threatened to be four separate investigations probably will be merged into one, since some of the members of committees concerned have suggested the formation of a joint investigating committee composed of members of the House and Senate public lands committees and the House and Senate naval affairs committees.

The two House committees held separate hearings last week, at which the principal witnesses were Secretary of the Navy Frank Knox and Assistant Attorney General Norman Littell. Mr. Littell had previously written an opinion for President Roosevelt declaring the contract illegal, and it was this opinion that caused the Navy to terminate the contract.

Denies Bad Faith

Secretary Knox declared that he believed the contract to be the best practical solution for the problem presented by the checkerboarded ownership of the field in that it permitted some production of much-needed oil during the war but promised to preserve most of the Navy's reserve. He denied that there was any implication of bad faith on the part of anyone in the Navy in negotiating the contract, and in this he was confirmed by Mr. Littell and by a letter from Abe Fortas, under secretary of the interior. Mr. Fortas and Secretary Ickes had objected to the contract, several months after it was signed, on the ground that it was not sufficiently favorable to the Government.

The only avenues open now, Secretary Knox told the congressional committees, are to abandon attempts to save the reserve, negotiate a new contract which will meet the approval of Congress, or acquire the Standard lands by purchase or condemnation. Mr. Littell favored condemnation, and gave the impression, without saying so, that he considered Standard's motives improper in accepting the contract. At one point he complained to the public lands committee that a Standard "lobbyist" was making faces at him and disconcerting him while he testified.

Hold-the-Linists Dominate OPA

(Continued from Page 20)

petroleum and its derived products is part of a general price freezing policy, production is stifled as emphasis is placed more and more upon the main objective, price immobility. When an increase in any price is refused because of an assumed or possible effect on other prices in a system which brooks no change in average price, we have, to say the least, an impasse.

Moreover, there is a source of cost increases in the case of petroleum which is not related to changes in the unit prices of goods and services entering into its discovery and production. I refer, of course, again to that increment of cost arising out of the increasing difficulty of finding oil. This is a condition peculiar to petroleum. It should be recognized by the price control authorities and due allowance made for it. Relatively moderate changes in prices, possible now to effect a gradual extension of productive capacity, would avoid violent changes in prices necessitated by shortages developed otherwise in the future. Violent price changes have always been accompanied by inefficiency and waste, the antithesis of conservation.

Present Controls

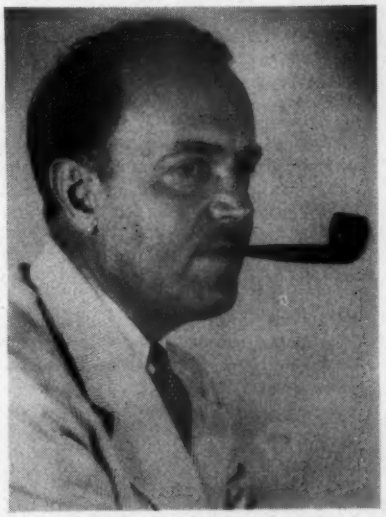
Our industry has learned to live under controls on its crude-oil production processes. Indeed many of the present oil-field controls have been initiated by the industry; all of them have been implemented by regulations promulgated by appropriate bodies of the compact-member states. But these controls have in the main been either of a police-power nature or designed to deal solely with technical aspects of crude-oil production in order that perfection might be approached in the practice of the principles of conservation. Economic control, to the extent that it has been exercised, has been incidental.

Profound, perplexing questions are following in the wake of our current experiences. Many of them will go unanswered in the event of an early termination of the war and a prompt return to a wholesome degree of economic freedom. But there are other questions which must be answered soon if the prospect is for an indefinite prolongation of the war. Some of them center around the character of the existing price control: How long will crude prices be kept at their 1937 price level while the average of all commodity prices is now 20.5 per cent above the 1937 level? How much oil can we afford to waste or what further restriction of civilian consumption impose in order to avoid raising petroleum products prices by about 7 per cent?

The Journal Presents New Series on Oil-Well Pumping

STARTING in this issue (p. 29), the Journal presents a series of articles of vital importance to engineers and operating men in the petroleum industry. The series, entitled "Oil-Well Pumping Methods," was prepared by Joseph Zaba, of Rio Bravo Oil Co., Houston, Tex., one of the industry's most widely known production engineers.

This treatise covering modern oil-well pumping methods was written expressly and exclusively for The Oil and Gas Journal, and in its entirety will be the most comprehensive discussion of the subject ever published. The discussion is particularly timely now, when drilling is curtailed and pumping wells, whence comes most of the nation's oil, must be operated at maximum efficiency.



J. ZABA

First to be discussed will be the characteristics of oil reservoirs in relation to the pumping problems. Analyses follow in later installments on the fundamentals of oil-well pumping operations, instruments used for testing, sucker-rod fatigue and failures, loads, design and selection, sucker-rod pumps and their action, types of plunger problems, selection, displacement, efficiency, submergence, speeds and common troubles. Other subjects that will be treated include purposes of counterbalancing and the calculations involved, surface pumping equipment, prime movers, new methods including the hydraulic and the submergible electrical centrifugal pumps, well-servicing problems, well troubles and well testing.

The articles are well illustrated with charts and graphs and will also include tables for calculating various factors in the design and operation of pumps. Each installment will discuss completely one specific phase of the subject.

Mr. Zaba, author of the series, has an impressive background of technical preparation and practical experience. Since entering the petroleum industry in 1925, he has had first-hand experience in many phases of field activity.

International Scholar

Born in Krakow, Poland, he received his elementary and secondary education there, then spent 2½ years at the Vienna, Austria, Institute of Technology. He returned to Krakow and spent a year in the department of physics and mathematics at University of Krakow, and 3 years at the Academy of Mines, from which he received the degree of mining engineer in 1923.

Mr. Zaba came to the United States in 1924 and immediately entered the petroleum engineering school of University of Pittsburgh, receiving a master of science degree the following year.

He then went to work for Vacuum Oil Co. in the Lockport field near Lake Charles, La., as a rig helper. A year later he joined Rio Bravo Oil Co., working in the Spindletop and Pierce Junction fields as roustabout, treater, gager, pumper and material clerk. After a year and a half, he was transferred to the general office of the company at Houston, where he had charge of testing new materials and treating operations. During the past 10 years, in addition to other duties, he has had charge of all the engineering problems connected with the drilling and producing operations of the company.

Mr. Zaba is an active member of the American Institute of Mining and Metallurgical Engineers, American Association of Petroleum Geologists, American Petroleum Institute, Houston Geological Society and the Houston Engineers Club. He is the author of a number of technical papers and articles and is coauthor of "Practical Petroleum Engineers' Handbook."

Higher Prices, More Lines Solution to Oil Dilemma, Naval Affairs Group Told

by Harry F. Simons

DALLAS, Tex.—With considerable heat and a little new light coming from the witnesses, the oil subcommittee of the House naval affairs committee obtained a cross-section of the opinion of operating men in the oil industry at its hearing here June 24 and 25. In addition to being concerned over the supply of oil necessary for Army and Navy prosecution of the war, committee members were obviously interested in the fulfillment of civilian (particularly East Coast) requirements during and after the war and in learning if members of the industry felt government agencies had bungled in handling oil problems in the past 2 years.

The subcommittee is composed of L. Mendel Rivers, Charleston, S. C., chairman; William H. Wheat, Rantoul, Ill.; George J. Bates, Salem, Mass., and F. Edward Hebert, New Orleans, La. Capt. R. L. Graham, U. S. Army, is legal attache. The committee held previous hearings in Illinois, Arkansas and Mississippi. After spending June 26 at New Orleans, the subcommittee returned to Washington to study the facts gathered and to recommend if necessary legislation on price, pipe lines, labor and material supply.

When Representative Bates asked Beauford H. Jester, chairman of the Texas Railroad Commission, what Texas could do about supplying more petroleum and its products to the East Coast. Mr. Jester replied, "We are like the Army mess sergeant who cries, 'Come and get it.'"

Mr. Jester pointed out that in view of the potential increased demand for Texas crude oil, the Railroad Commission had wanted for a long time to boost the allowable so that storage in the state could be filled and used as a supplementary source of supply to the output of wells during times of heavier demand. The commissioners believe that if this is not done, damage to the fields will result when an attempt is made to meet peak requirements with current production at some future time. PAW directives, which set the state's production quota, prevent the commissioners from permitting a withdrawal rate which would build up this storage.

In reply to questions from the congressmen, Mr. Jester stated that costs of producing oil had risen 40 per cent and if the price of oil had kept step with 167 other commodities it would now be at $1.87 per barrel where it should be; that pipe lines for relieving the East Coast shortage could be built to West Texas, the Gulf Coast and East Texas provided the water-oil ratio was reduced in the latter pool and the East Texas Salt Water Disposal Co. was given material with which to carry out its program; that the 24-in. and 20-in. pipe lines in his opinion had taken a toonortherly route and that in case another line was built it should follow a route similar to the Plantation line and that the present two big pipe lines would wind up in the hands of integrated oil companies after the war.

Delivery Schedules Reported

Normal eastern demand as obtained from previous testimony at committee hearings and announced at Dallas totals 1,500,000 bbl. daily; military demands are 400,000 bbl. daily and deliveries are or will be 700,000 to 900,000 bbl. by tank car, 300,000 by the 24-in. line, 235,000 by the 20-in. line, and 80,000 bbl. by tanker which leaves an unfilled balance of roughly 500,000 bbl. per day. Rep. L. Mendel Rivers, Charleston, S. C., then said that several months ago the committee had requested PAW to suggest where another pipe line could and should be built and so far, PAW had never answered the request.

Figures quoted by Representative Bates as having been presented to the committee on the cost of various methods of transportation to the East Coast were:

How shipped—	Cost per barrel
Pipe line	$0.31
Tanker	0.40-0.50
Barge	1.20
Tank car	1.40-1.80

Of the 31 cents per barrel pipe-line cost, 13½ cents goes for maintenance which leaves a balance of 17½ cents per barrel permitting amortization of the line in 5 years. Investment of $90,000,000 in another line would result in the saving of $10,000,000 monthly on the transportation cost of oil to the East Coast and the congressional committee is interesting it-

Three of the four members of the House naval affairs subcommittee at the Dallas, Tex., hearing on the oil situation. They are Rep. George J. Bates, Salem, Mass.; L. Mendel Rivers, Charleston, S. C., and W. H. Wheat, Rantoul, Ill.

self not only because of the war situation but as a permanent economic fixture of the nation. Members of the committee repeatedly asked witnesses where such a line could be built. One member of the committee commented that the investigation so far had shown that pipe lines were the cheapest method of transporting oil in terms of money, manpower, steel and horsepower.

When queried about the amount of price increase most witnesses made the statement that trial and error could best determine that and probably the best way would be to boost crude 50 cents immediately and then wait to see how wildcat drilling was stimulated. If 50 cents proved to be not enough, further increases should be made. Several witnesses stated that the Government may eventually have to permit oil to go as high as $3 per barrel to insure an adequate supply for the country.

Want Raises Passed On

Practically all of the witnesses agreed with the committee that increased prices should be passed on to the consumers of petroleum products. The 50-cent-per-barrel increase would amount to approximately 1¼ cents per gallon of gasoline and one member of the committee said he was sure that the consumer would be glad to stand the increase to insure an adequate supply.

Dr. F. H. Lahee, geologist, Sun Oil Co., Dallas, said technical exploration for geologic structures followed by drilling often resulted in dry holes. Of the 3,212 wildcat wells drilled in the United States in 1942, 492 discovered new reserves and 2,720 were dry, or one success for every 6.5 wildcat tests drilled. Analogous figures for Texas are 1,076 wildcats drilled, 183 discoveries, 893 dry holes, or one success for each 5.89 wildcat tests.

The 1943 rate of wildcat drilling for the first 5 months, if continued throughout the remainder of the year, will result in the completion of 3,278 wildcats, approximately the same as for 1941 and 1942 but still considerably under PAW's recommended 4,500 exploratory wells.

It has been found most practicable to estimate reserves uncovered by successful wildcats under two heads: (1) Those proved reserves newly discovered and blocked out by drilling within a given year; and (2) those reserves added by subsequent drilling of a given pool in each successive year as long as the boundaries of the pool are extended.

H. P. Nichols, Tyler, Tex., independent producer and president of the East Texas Oil Association, said the greater portion of the oil being used now is being withdrawn from pools discovered 10 to 15 years ago. It requires 2 or 3 years to find a field and 2 to 4 years more to develop it.

(Continued on Page 28)

Federal Order Digest

PAW Regulations

Marketing Equipment — PAO 12: Replaces WPB M-68-c, prohibiting use of maintenance or repair equipment for construction, improvement or replacement of materials unless unsafe or unserviceable, effective July 1.

Field Stocks—Twelve depots established for handling oil-country tubular-goods emergency stocks, simplifying distribution of pipe to wildcat operations, announced June 24, expected to be in operation in August.

Eastern Supplies—Establishes quota of 328,000 bbl. daily of gasoline for distribution in eastern shortage area during July, issued June 25.

Fuel Oil—PAO 13: Limits delivery of fuel oil anywhere in the United States, replaces WPB L-56. In 14 states brought under limitation for first time, order prohibits delivery of fuel oil for use in new burners and those converted after July 22, 1943, effective July 8.

OPA Orders

Petroleum Products — RPS 88, Amendment 110: Establishes specific ceiling prices for fuel oil delivered by tank wagons or steel drums in the Philadelphia, Pa., area, effective June 24.

Steel Tanks—MPR 411: Sets specific maximum prices for reusable steel storage tanks, field assembled, according to a table on capacities, condition and specifications, effective July 2.

Leased Machinery—RMPS 41: Calls for submission of proposed rental rate to OPA, if lessor had no published or confidential rate in effect October 1, 1941, effective July 1.

Brass Products—MPR 408: Stabilizes distributors' maximum prices at October 1941 levels, permits mark up over mill prices existing at this time of 3 cents a pound, except on pipe or water tubing, effective June 21.

Steel Castings—RMPS 41, Amendment 6: Fixes maximum charges producers may make for machining of steel castings on the base existing March 31, 1942, effective June 28.

Tires and Tubes—MPR 119, Amendment 4: Provides procedure for pricing tires and tubes made since 1941, effective June 30.

Tire Mileage — MPR 414: Creates specific maximum prices for the supply of tire mileage and servicing of rubber tires and tubes furnished to commercial users under contract, effective July 2.

Unrepaired Tires—RO 1a, Exception 47: Provides for retail sale of suitably branded unrepaired used tires to holders of rationing certificates, effective June 25.

Emergency Tires — MPR 107, Amendment 12: Sets ceiling price for unrepaired "emergency tires" of $1 per tire, permitting sale of low-quality used tires without rationing certificate for first time, effective June 22.

Mileage Rationing—RO 1a, Amendment 35: Reduces the number of low-mileage passenger-car drivers eligible for used and recapped tires, because of a temporary shortage, effective July 1.

Rubber Commodities — SR 14, Amendment 190: Provides uniform method for adjusting prices in eight maximum price regulations which affect various types of rubber commodities, effective July 2.

WPB Regulations

Gas Cylinders—GPO M-233, Interpretation 1: Prohibits use of maintenance, repair and operating privileges in obtaining gas cylinders from manufacturers, issued June 25.

Steel Tubing—LO L-126, Amendment 1, Schedule 3: Permits use of seamless steel tubing in manufacture of finned coil or tube assemblies as part of refrigerating equipment until September 15, 1943, issued June 26.

Steel Warehouses—GPO M-21-b-1, amended: Relaxes restrictions on steel fabricators who have done only a limited warehouse business, eliminating previous limitation that at least 25 per cent of business be of a warehousing nature before he could be so classified, effective July 1.

Steel Deliveries—CMP 1, Direction 18, amended: Forces steel producer to notify customer as soon as he finds that he is unable to make delivery in the month requested, effective June 24.

Pressure Gages — GCO L-268, amended: Removes "case and bezel or slip ring of pressure gages" from the list of parts in which the use of nonferrous metals or stainless steel is prohibited in oxyacetylene apparatus, effective June 22.

Welding Rod—CMP 5, Direction 7: Prohibits treatment of welding rod as an operating supply under CMP, if used for manufacturing purposes, effective June 26.

Glycols—AO M-215, amended: Establishes minimum volumes which purchasers may acquire and manufacturers may sell without specific WPB authorization, issued June 25.

Penn Grade Association Repudiates Government-Subsidy Proposals

by J. P. O'Donnell

PITTSBURGH, Pa.—Even with full recognition of the fact that their existence is threatened, members of the Pennsylvania Grade Crude Oil Association still went on record as opposing a government subsidy which they described as unworkable and un-American. This sentiment was contained in a resolution adopted at their twentieth annual meeting here last week.

Members recommend that the board of directors should seek:

"1. Prices for refined products that will support a substantial increase in the price of Pennsylvania Grade crude oil;

"2. The continuance of the present depletion schedule and the right to expense intangible drilling costs in the income-tax law and the removal of uncertainty by a flat statement from the Treasury Department that it will discontinue its fight for their removal;

"3. A realistic approach by the Office of Price Administration and no more talk of an unworkable subsidy;

"4. All petroleum activities coming under governmental jurisdiction excepting transportation be placed under one agency—the Petroleum Administration for War;

"5. A production, refining and marketing research program by the Pennsylvania Grade Crude Oil Association;

"6. The collection, correlation and dissemination of all pertinent information having to do with the mechanical operation of wells and properties throughout the region with emphasis on the area south of Bradford;

"7. A wildcatting program which will be wholly financed by producers and refiners who wish to participate, and

"8. Hard work on the part of every one connected with the industry including producer, refiner, transporter, drilling contractor, management and employes."

This resolution embodied recommendations of a group of producers and refiners of Pennsylvania Grade oil formed to chart a program they should pursue to continue their existence. It was adopted after the association had heard a realistic and pessimistic appraisal of the region's prospects under existing conditions by Ralph T. Zook, president of the Sloan & Zook Co., Bradford. Under these conditions, Mr. Zook predicted, Pennsylvania Grade production would decline from 72,510 bbl. per day in 1943 to 67,550 in 1944, to 62,888 in 1945, to 57,450 in 1946, to 53,206 in 1947, to 49,857 in 1948, to 46,819 in 1949 and to 43,430 in 1950. After predicting this trend, he pointed out that in 5 years production will be below 50,000 bbl. per day and declared that the Pennsylvania industry, "as it is now constituted, cannot function on that amount of oil."

Zook Outines Problems

Mr. Zook discussed each of the points contained in the association's resolution emphasizing the need for an adequate price and for retention of the depletion allowance. Regarding prices, he said:

"Had the upward trend in crude and refined products prices in evidence during the latter part of 1941 been allowed to continue in step with other principal commodities, I am confident that neither the Pennsylvania Grade area nor the nation would be facing the critical crude shortage that they are today. The oil industry cannot function under increased labor, material cost and taxes while the national index for oil stands at 60 and gasoline at 68 when farm prices have risen to 106, food prices to 110 and metal prices to 103."

Leon H. Gavin, Oil City, congressional representative from Pennsylvania's twentieth district, who is credited with enlisting the support of eastern congressmen for a crude-oil price rise, directed a vigorous attack on government by bureaucracy in an address before the dinner meeting. He saw no dangerous inflation in increased oil prices.

"Let us assume," he said, "that the Petroleum Administration for War is primarily interested in producing the materials essential to winning the war. Let us, on the other hand, assume that the Office of Price Administration is concerned in restricting

This group represented Brundred Oil Co., Oil City, Pa., at the meeting. They are: H. D. Brown, Jr., production superintendent; Roy E. Bailey, drilling superintendent; H. D. Brown, Sr., secretary, and R. B. Bossler, chief production engineer

A. E. Booth, Bradford producer, and D. T. Ring, Preston Oil Co., both directors of the association

Rep. L. H. Gavin, S. F. Pratt, general secretary of the association, and Parker Melvin, retiring president

prices so as to prevent injurious inflation. We recognize that both have their places in the picture. However, I think it will be agreed that there has been no inflation in the price of crude oil heretofore and the small amount of increase in refined products that would be required to take care of an average of 50 to 75 cents a barrel would not produce dangerous inflation. The first consideration in the entire picture is the winning of the war. . . . It is a critical situation and it will be a terrible catastrophe and a responsibility I would not care to be charged with if, within a few months from now, by reason of the short-sighted policy of the OPA, we find ourselves without sufficient oil to fully fuel the machines of war."

Pennsylvania's governor, Gen. Edward S. Martin, also spoke at the dinner session. He characterized subsidies, which the industry does not want, as the "most dangerous type of political bribery ever considered in this country."

Col. Ernest O. Thompson, a member of the Texas Railroad Commission, also attacked the subsidy proposal on the basis that it would attract those who would drill for the subsidy and not for oil. He said that prospective demands would be enormous and that we now need the discovery of a major oil field every week, fields capable of producing 30,000,000 bbl. The time is rapidly approaching when all fields will be producing at the maximum efficient rate and we need the drilling of 6,000 wildcats instead of the 4,500 planned this year.

Consumers' Appreciation Rising

Robert E. Allen, assistant deputy petroleum administrator, said that the present shortage is developing an appreciation on the part of the consumer of the value of oil and it should be so administered as to foster that appreciation. Otherwise, he contended, the industry cannot expect the support necessary to maintain supplies. He told the Pennsylvania industry that it is supplying about 40 per cent of the lubricating oil consumed by our war machine but questioned the future. He cited the stock-piling program now in progress to accommodate future demand and said that the industry is capable of meeting requirements in the last half of 1943 and that the cooperation of all refiners will be needed to meet the demands of 1944.

Gov. Andrew F. Schoeppel of Kansas, chairman of the Interstate Compact Commission, described the compact's functions as the operations of a voluntary, harmonious, democratic group. It is fighting federal domination now and will fight to regain democracy after the war.

Parker L. Melvin, retiring president of the association, noted the increasing military demands for lubricants and said that the Pennsylvania industry, an important source of such products, is not better able to supply those demands today than it was a year ago. "I hope it never comes about that our aviation cannot be used to the maximum efficiency because some branch of our Government failed to do what was necessary to insure a steady and an ample supply of crude and refined products."

Rudolph G. Cubiciotti, of L. Sonneborn Sons, Inc., spoke on the competitive position of Pennsylvania oils. He reviewed developments in motor cars that have required better lubes and progress in processing that has provided the better oils. He concluded that "the overwhelming mass of evidence, accumulated through the years, proves that Pennsylvania oil is the world's best."

S. F. Pratt, general secretary of the association, reviewed developments during the past year. He recognized the fact the industry which it represents is struggling for survival at the moment but predicted that, "while it has been knocked around and buffeted severely many times, the time when it is ready to be counted out is still a long way off."

New officers elected were: D. T. Andrus, Bradford, president; A. C. Simmons, Bradford, first vice president, and D. T. Ring, Columbus, Ohio, second vice president. All other posts were filled by reelection.

Higher Prices, More Lines Solution to Oil Dilemma

(Continued from Page 25)

W. S. Heatly, Jr., Hunt Oil Co., said lifting costs had increased 73.1 per cent in 6 years. W. L. Stewart told the committee members that 11,000 small wells were plugged last year because they could not be operated at the present price.

Arch L. Rowan, Rowan Drilling Co., Fort Worth, Tex., said that the labor problem was becoming extremely serious for the drilling contractor. Inexperienced personnel can cause the loss of the hole and reduce efficiency 30 per cent. Injuries cause increased compensation-insurance cost. Deferment of oil workers will be necessary in addition to the 50-cent per barrel price increase and other aids.

M. T. Flanagan, independent, Longview, Tex., said a fair price increase for oil could be obtained by multiplying the number of gallons of gasoline produced from a barrel of crude by the difference between the old and present price of gasoline.

C. P. McGaha, Fain & McGaha, Wichita Falls, Tex., and president of the National Stripper Well Association, defined a stripper well as one producing oil at a cost approximately equal to the price obtained for the oil. There are approximately 300,000 such wells in the United States producing 1.5 to 2 bbl. per day with a weighted average of 1.9 bbl. per day. These wells represent 20 per cent of the nation's reserve and 15 to 20 per cent of the nation's supply. Eventually every well becomes a stripper. About half of the nearly 12,000 stripper wells abandoned in 1942 would have been saved by a better price.

Joe Zeppa, Delta Drilling Co., Tyler, and a director of the Premier Oil & Refining Co., Fort Worth, said price affected stripper wells because the daily income determined the value of the wells and a higher price naturally permitted them to operate at lower production rates; the cost of a barrel of oil varies with the area, depth, sand thickness, reservoir condition and grade of oil; wells of the same depth do not have the same cost and a number of fields in Texas cannot be developed at the present price.

It is true that oil companies are operating at a profit, Mr. Zeppa admitted, but said that they are doing it on reserves under a different price structure. We are literally selling ourselves and the country out of the oil business at present. Mr. Zeppa was asked if he thought the refiners could absorb a price increase of 50 cents per barrel and said his own company netted 20 cents per barrel before taxes and 4 cents after taxes.

Mr. Zeppa was also asked by the committee about the experience of J. R. Parten, director of the Transportation Division of PAW, and replied that he had known Mr. Parten to be in the oil business since 1920 and that he was an unusually competent man.

Texas Co. Drilling Increased

E. R. Filley, assistant manager of production, Texas Co., said his company was trying to expand its geophysical department but couldn't get sufficient nonscientific material. Suitable personnel is also scarce. Drilling for his company is 10 per cent above last year and the company was completing about 50 wells per month. Wildcatting for his company is a little over last year and it would be further expanded if the price of oil went up. He said his company had liberalized its policies and was contributing to wildcats by other operators with acreage and bottom-hole money and lease purchases but was not contributing material.

F. E. Heath, petroleum engineer, Sun Oil Co., Dallas, said that there were about 600 fewer drilling rigs running now than last year, that the transportation of oil eastward was a very serious problem and that locating another pipe line to supply the East Coast was a matter for the pipeline men to decide.

Four-Year Extension of Oil Compact Requested

WASHINGTON, D. C. — President Roosevelt June 28 asked Congress to enact legislation approving a 4-year extension of the Interstate Oil Compact which expires September 1.

DEATHS

William B. Gillies, 60, vice president in charge of operations of the Youngstown Sheet & Tube Co., and president of the Youngstown (Ohio) Chamber of Commerce, died June 20 in a Youngstown hospital after a heart attack. Survivors include the widow; two sons, William B, Jr., who is associated with the Rust Engineering Co. of Pittsburgh, and Lt. Donald H. Gillies of Fort Knox, Ky.; two brothers, Frederick M. Gillies, general superintendent of the Inland Steel Co. at Chicago, and Robert A. Gillies, who is vice president in charge of operations of the Steel Co. of Canada at Hamilton, Ont., and a sister, Mrs. Andrew Jaicks of Hinsdale, Ill.

James Benjamin Scott, employed with Canadian Oil Companies, Ltd., refinery at Petrolia, Ont., since its inception 45 years ago, and later head of the refined wax department, died at Petrolia.

Dr. George Curtis Martin, 68, geologist and executive secretary of the U. S. Board on Geologic Names, died June 22 at his home in Washington, D. C. He had served on the board since 1935, previous to which he had been connected with the Geological Survey of the Department of the Interior as assistant geologist, paleontologist and geologist from 1904 to 1924. Between 1924 and 1935 he was consulting oil geologist in the United States and Mexico. A son and a daughter survive.

Paul Hubert Elder, 54, veteran employe of Oklahoma Natural Gas Co., died unexpectedly at his home in Tulsa last week. Mr. Elder was born in Kentucky, and had been with Oklahoma Natural for 21 years and for several years had been pressure man at the company's South River station. Three brothers and three sisters survive.

Norman F. Cox, 69, who came to the Oklahoma oil fields 30 years ago and had lived in Tulsa for 20 years, died at his home here last week. The widow, two sons and two daughters survive.

Edward John O'Shea, 45, who had been employed by National Transit Co. for 23 years, died at his home in Duke Center, Pa., June 21, after a year's illness. His widow, a son and a daughter survive.

Dr. T. T. Beeler, 61, formerly a Tulsa oil man and later a dentist of Oklahoma City, Okla., was electrocuted last week as he attempted to repair an electrical connection under his home.

William F. Reagan, a former resident of Bradford, Pa., where he had been employed as an oil driller, died at his home in Belmont, N. Y., June 15. His widow survives.

George B. Fasenmyer, 77, oil and gas producer, died at his home in Leeper, Pa., last week, following a heart attack. He had been a resident of Leeper for 36 years. He is survived by his widow, two sons and two daughters.

RESERVE STATISTICS FOR TEXAS

	1941 (bbl.)	1942 (bbl.)
a. Total proved oil reserves as of Jan. 1 of year indicated	10,623,516,000	10,975,641,000
b. Proved oil reserves newly discovered during year indicated	170,364,000	106,653,000
c. Proved oil reserves added by extensions during year indicated	689,345,000	944,804,000
d. Total new reserves (b plus c)	859,709,000	1,053,457,000
e. Production during year indicated	507,584,000	483,371,000
f. Wildcats (dry holes and discoveries)	1,210	1,076

Engineering and Operating

Oil-Well Pumping Practices

by J. Zaba

NEARLY 90 per cent of all the wells operating in this country on January 1, 1943, produced oil to tanks by application of different methods of mechanical lift. Among the methods used, oil-well pumping is applied in such an overwhelming majority of cases that it has to be considered as the most important of all the oil-field production practices.

From comparatively crude installations of 20 years ago the oil-well pumping methods reached their present level of high efficiency along three general lines of evolution. The earliest efforts toward improvement were concentrated on bettering of mechanical features of the pumping mechanism, both from the standpoint of material used and from the standpoint of design of equipment. These efforts were highly successful. Under exigent demands of the competitive system of free enterprise and through cooperation of the manufacturers with engineering departments of the producing companies great strides have been made toward making modern pumping installations from the mechanical standpoint, highly efficient units.

The second line of evolution was the study of the basic principles underlying and governing actual performance of the subsurface portion of the sucker-rod pumping mechanism. Application of results of these studies to practical field operations contributed further toward improvement in design of equipment, furnished solution for many difficult pumping problems and permitted setting up of standards for economical pumping operations. The third line of improvement was the application of results of research on the behavior of oil reservoirs to the problems of pumping operations. This development, although comparatively recent, has contributed already toward raising the level of efficiency of oil-well pumping operations.

Purpose of Series

It is the purpose of the series of articles to follow to present a concise treatise on the subject of modern pumping operations taking into consideration their present status along these three lines of evolution. To accomplish this the articles will discuss modern pumping equipment, both surface and subsurface, and will present practical application of the results of research to oil-well pumping problems. No attempt will be made to include theoretical investigations which are still controversial or which, because of their nature, belong in the realm of pure research. The practical side of the subject will be emphasized even though this may necessitate discussion of subjects which may appear quite fundamental.

It is planned to make each installment a self-containing unit and arrange the installments in a logical sequence. The summary of fundamentals of reservoir behavior will be followed by a classification of pumping methods. Of these methods, the sucker-rod pumping system will be considered first. This part of the series will cover discussion of studies of subsurface pumping equipment, application of results of these studies to oil-well pumping and surface-equipment problems, including counterbalancing and power requirements. Following installments of the series will discuss other pumping methods, well servicing and miscellaneous data. An alphabetical index of the subject matter will conclude the series.

The literature on oil-well pumping is very extensive and problems outlined above have been covered by many articles and technical papers during the past 15 years. To assure proper credit to the source of information and to provide quick reference for the reader in case more detailed study of any particular subject is desired each installment will include a selected bibliography.

Basic Principles of Reservoir Behavior—Part 1

General

THE beginning of intensive studies of performance of the oil reservoir and of the mechanics of displacement of oil in the reservoir can be traced back to about the middle twenties when general cognizance was given to the fact that data collected at the casing head of a well are not sufficient for proper analysis of reservoir problems. Undoubtedly this fact was recognized and reservoir studies were being made prior to this period but it is in the last 15 years that extensive investigations of reservoir characteristics were instigated. Laboratory experiments and mathematical analyses of the problems were aided by the development of instruments for measuring subsurface pressures and temperatures and for collecting samples of oil under bottom-hole conditions. Data collected by use of these instruments were used for checking the results of theoretical investigations and formed a basis for the development of the modern concept of the efficient production of crude oil. The behavior of underground oil reservoirs is extremely complex. Many investigations of this behavior are still in their initial stages and the results of others are still controversial. Others, however, furnish the basic principles of oil-reservoir behavior.

A well penetrating an oil reservoir

A biographical sketch of Mr. Zaba and an outline of the series which starts with this issue will be found on page 23.

creates conditions essential to the production of oil.[1,2,3,4] Pressure differential is established between the oil reservoir and the well bore and displacement of crude oil by other fluids is made possible. Fluids available for displacement are gas and water and displacement itself is in form of simultaneous flow through sand of the displacing fluid and of oil. The ease of flow of fluids and oil through sand depends on the characteristics of the sand and of fluids, as well as on the relative saturation of the sand with oil and other fluids. The permeability of sand to a fluid decreases with decrease in saturation with this fluid. Thus with sand at first highly saturated with oil the effectiveness of the displacing fluid is high since the oil flows readily through the sand. As the oil saturation decreases the permeability of sand to oil decreases while its permeability to the displacing fluid increases. As the process continues increasingly large amounts of the displacing fluid are needed to move continuously decreasing amounts of oil. No complete displacement of oil is possible.

Types of Drive

Depending on the nature of the displacing fluid, the producing reservoirs are divided into gas-expansion, water-drive and combination - drive reservoirs.[4,5] Gas may be present in an oil reservoir in two forms, as gas dissolved in oil and as both dissolved and free gas.

Recovery of oil through expansion of dissolved gas alone is essentially inefficient. As the pressure in the reservoir decreases to the saturation point the gas which escapes from solution expands and the mixture of oil and gas moves toward the well. As additional amounts of gas are liberated the gas saturation of the sand and its permeability to gas increases, permitting larger amounts of gas to flow to the well with the oil. Finally a maximum is reached after which there follows a decline in the amount of gas accompanying oil as result of the decline of gas supply. With gas expansion the only energy available for moving oil toward the well and with gas supply eventually exhausted a large portion of the oil remains unrecovered in the reservoir. Since the liberation of gas takes place throughout the sand mechanical control of the gas is difficult. Through low production rates segregation of gas and oil as result of gravitational forces may be effected. This would create a zone of high gas saturation above the oil zone. If this zone can be maintained and expanded results similar to those obtainable by proper use of "gas cap" can be attained.

When gas is initially present as free gas above oil, proper production practices may utilize expansion of the gas for increasing oil saturation in the oil zone and, consequently, better recovery of oil.

Water-drive reservoirs are under hydrostatic head of water which enters the formation through the outcrop, through porous formations or through faults. In initial stages the reservoir produces usually because of the energy of the expanding dissolved or free gas. As the resulting pressure gradients extend toward the limits of the reservoir the movement of the water into the previously oil-saturated part of the reservoir begins. This movement is a result of actual flow or expansion of water upon reduction of pressure.[6] Depending on the rate of withdrawal three types of conditions may occur: (1) Rate of production withdrawal is higher than the rate of advance of the water front in which case the movement of oil is still a result of action of the expanding gas. (2) Production is such that the volume of the inflow of water about balances the outflow of oil and gas. The result is water drive which, if sufficiently slow, represents the most efficient means of recovery of oil.[4] (3) Rate of production is such that a combination gas-expansion and water drive is taking place.

Subsurface Pressures

Study of subsurface pressures is one of the most important parts of the investigation of the behavior of an oil reservoir since the differential pressure of the factor bringing about the movement of fluids in the reservoir toward the well and the reservoir pressure is the controlling factor for solution and escape from solution of gas dissolved in oil. Definitions of terms in common usage in regard to subsurface pressures and in regard to fluid levels, since latter are, in general, an expression of subsurface pressure conditions, are as follows:

Definitions[7]

Subsurface pressure is the pressure at any point within the flow column under any conditions of operations.

Static pressure is the subsurface pressure with the well closed in.

Flowing pressure is the subsurface pressure in a flowing well.

Bottom-hole pressure is the subsurface pressure at the average depth of a producing formation. In a closed-in well it is being called **bottom-hole static pressure,** in a flowing well **bottom-hole flowing pressure.**

Differential pressure is the difference between bottom-hole static and bottom-hole flowing pressure.

Datum pressure is the bottom-hole pressure corrected to a specific sea or subsea level.

The above expressions should be qualified by information showing the degree of equilibrium attained, in case of a static pressure, and by rates of production in case of a flowing pressure.[8]

Static fluid level is the point below the casing head at which the top of fluid is located in a closed-in well under conditions of equilibrium.

Working fluid level is the point below the casing head at which the top of the fluid is located in the annulus between casing and tubing during settled rates of production operations.

Drawdown is the difference between static and working level.

Measurements

Measurements of subsurface pressures can be accomplished either directly by means of subsurface pressure gages or indirectly by measuring the fluid level and the average fluid density. Under conditions of equilibrium the bottom-hole pressure equals the weight of the fluid column, plus the weight of gas above the fluid

column, plus casing-head pressure.

A subsurface pressure recording gage, of which there are several types in use, consists essentially of a case, pressure element, stylus and a clock or thermal motor to turn the chart.[8,9] The well pressure exerted on the pressure element causes it to move. This movement is recorded by the stylus on the chart. Modern subsurface pressure gages have a considerable degree of accuracy and if proper precautions are taken in regard to use of the instrument and to the conduct of the survey, satisfactory results can be expected. As far as the instrument is concerned, careful calibration is of primary importance. The condition of the well prior to making the survey is also of great importance. Conditions of equilibrium in static surveys and conditions of settled rates of production in flowing surveys must be assured if satisfactory data are to be secured.

Calculation of bottom-hole pressures from data including fluid level and weight of fluid will be discussed later in this series in conjunction with a review of methods for determining fluid levels.

Application

Data secured through subsurface pressure measurements are applied to the study of the reservoir as a whole or to the study of problems of individual wells. Only the latter, with particular reference to pumping wells, is within the scope of this series.

In individual wells subsurface pressure measurements indicate the relation between rates of production and encroachment of water in water-drive fields. They can be used for determining the probable flowing life of a well and, consequently, for estimating needs for lifting equipment, and for determining the size of the equipment needed. Use in estimating potentials of large-capacity wells results in saving of cost of equipment needed for making of such tests. In routine pumping operations determination of fluid level from bottom-hole pressure data is used to solve a number of problems. These applications will be discussed in conjunction with review of specific problems.

Bibliography

1. T. V. Moore, "Behavior of Fluids in Oil Reservoirs," Bull. Am. Assn. Petrol. Geol., 5, 22, No. 9, Sept. 1938, p. 1237.
2. T. V. Moore, "A Review of the Principles of Oil-Reservoir Performance," Am. Pet. Inst., Drilling and Production Practice, 1941, p. 97.
3. M. C. Leverett and W. B. Lewis, "Steady Flow of Gas-Oil-Water Mixtures Through Unconsolidated Sands," Trans. A.I.M.E., 1941, p. 107.
4. S. E. Buckley and M. C. Leverett, "Mechanism of Fluid Displacement in Sands," Trans., A.I.M.E., 1942, p. 107.
5. H. C. Miller, "U. S. Bureau of Mines, Report of Investigations 3634."
6. Ralph J. Schiltuis and William Hurst, "Variation in Reservoir Pressure in East Texas Field," Trans., A.I.M.E., 1935, p. 164.
7. D. G. Hawthorn, "Subsurface Pressures in Oil Wells and Their Field of Application," Trans., A.I.M.E., 1933, p. 149.
8. B. P. Kantzer and E. G. Trostel, "Oil Well Performance: A Discussion and Proposed Terminology," Am. Pet. Inst., Drilling and Production Practice, 1937, p. 118.
9. Henry G. Abadie, "Subsurface Pressure Recorders and Equipment," Pet. Eng., Nov. 1941, p. 69.
10. N. N. Jones, "Practical Use of Subsurface Pressure Measurements in East Texas," paper presented before East Texas chapter of the American Petroleum Institute, Division of Production, Dec. 10, 1940.

Questions on Technology

by W. L. Nelson

Towers Required in Superfractionating for 100-Octane Gasoline

Is it hard to separate the bad parts of a gasoline from the rest so that a 100-octane gasoline can be made? Is much equipment required?—G. P.

The question cannot be completely answered because the secrecy attendant to our war effort and because all of the facts about the fractionation of complex mixtures are not well understood.

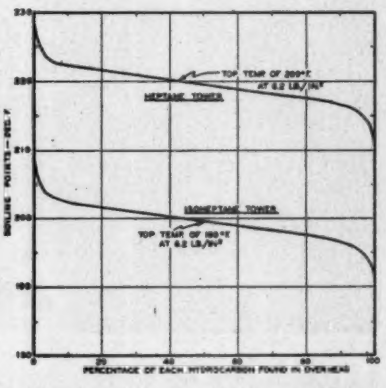
The precise separation of each hydrocarbon in a gasoline from each of the other hydrocarbons that are present is a nearly hopelessly difficult task, but certain low-octane fractions can be removed with far less difficulty. In a general way, the octane number of a low-boiling aviation gasoline can be increased by 2½ to 5 units in octane number by the removal of normal pentane (61.5 blending O.N.) and the substitution for it of isopentane (99.5 blending O.N.). This is not a difficult fractionation job, involving only about 30 plates in each fractionating tower and a reflux ratio of about 10 to 1. One tower would be needed to debutanize the gasoline, a second to remove isopentane, and a third to remove normal pentane. These hydrocarbons are far removed in boiling point from associated hydrocarbons, such as neopentane and cyclopentane.

The separation of hydrocarbons, whose boiling points are closer together, is far more difficult. Tabulated here are most of the hydrocarbons that may be encountered in the boiling range extending from 187° to 230° F., i.e., in the range of normal heptane:

	B.P., °F.	Blending O.N. (research)
3,3-dimethyl pentane	187	98
2,3-dimethyl pentane	193	94
Isoheptane	194	55
3-methyl hexane	195	65
1,3-dimethyl pentane	195	51
3-ethyl pentane	204	68
Normal heptane	209	0
Ethyl cyclopentane	217	59
2,2-dimethyl hexane	222	64.5
2,5-dimethyl hexane	229	69
Toluene	230	123.5
2,4-dimethyl hexane	230	64.5

From the standpoint of boiling points this is a fortunate situation because the octane numbers of all of the hydrocarbons closest in boiling point to normal heptane are somewhat low, whereas those that boil in and about 187° F. and in and about 230° F. have high octane numbers.

Barring the formation of constant-boiling mixtures, the separation of a cut ranging mainly from 204° F. to 217° F. can be accomplished with ease. The use of 40 plates with a reflux of 12 to 1 will produce a heptane product which will contain substantially all of the normal heptane present in the feed, and less than 10 per cent of those hydrocarbons which boil at 225° F. and at 200° F. will be included in the heptane product. Curves indicating the degree of separation are shown on this page. These curves were computed by the methods outlined on pages 489-504 of the second edition of Petroleum Refinery Engineering (McGraw-Hill Book Co.) using infinite reflux and a pressure of 6.2 lb. per sq. in.



According to these curves the percentages of each hydrocarbon to be found in the isopentane cut (below 209° F.) and in the heptane cut are shown in columns (3) and (5) of Table 1.

The percentage analysis of the heptane cut shown in column (5) cannot be given unless the analysis of the feed stock is known. Nevertheless, in order to indicate the general character of the product, it may be assumed (for simplicity) that each of

(Continued on Page 52)

Combination Gas-Lift and Repressuring Plant Used in Payton, Texas, Pool

by Harry F. Simons

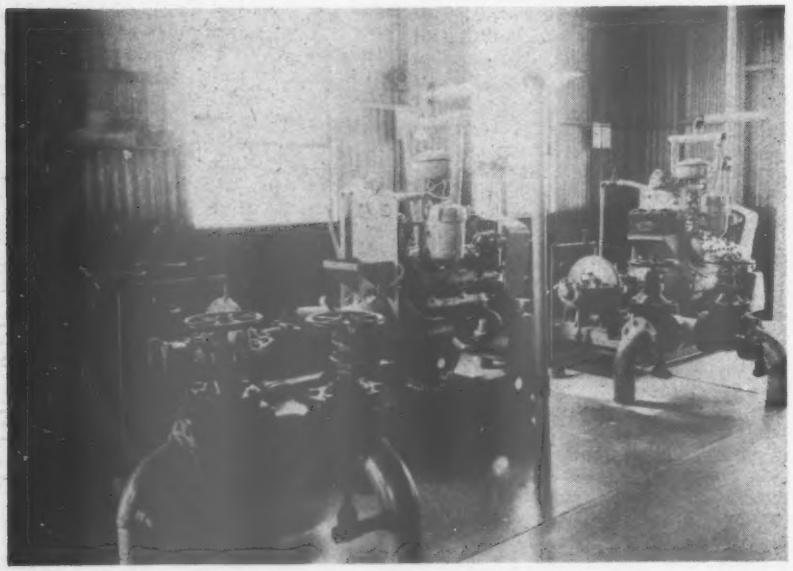
THE combination of two production methods which use similar equipment is being successfully applied by Luse & Ice, independent operators, in the Payton pool of Ward County, Texas. Repressuring of two leases and the gas lifting of the wells on the properties are carried on from one central plant and both operations are regarded by the owners as highly successful.

Four years of successful operation with a diminution of water, maintenance of high pressures and production well in excess of that of the rest of the field is the record of the properties described in this article.

The principal requirement for both repressuring and gas-lifting of the production is a source of high-pressure gas. When it became necessary to install lifting equipment in the field, gas lift was considered as a method. Shortly after the field's discovery and development in 1938 efforts were made to unitize and repressure the entire pool but complete agreement among the operators could not be reached and the plan was dropped. However, Luse & Ice, the operators of two of the leases, decided to repressure these properties and to build a plant which could be used for both repressuring and gas lift.

The plant was built in 1939 and has operated continuously since. At the present time it is supplying 1,250,000 cu. ft. of gas for injection into the formation through three wells and for the lifting of the production from 16 wells by gas lift. There are two flowing wells on the properties and one pumping well; only recently a third well which had been flowing was converted to a gas-lift well.

The leases being repressured are



Left: V-type automatic engine direct-connected to centrifugal pumps to provide circulation of engine-jacket cooling water

Below: Over-all view of combination repressure and gas-lift plant showing two 7-in. gathering lines entering scrubber and a portion of the overhead piping

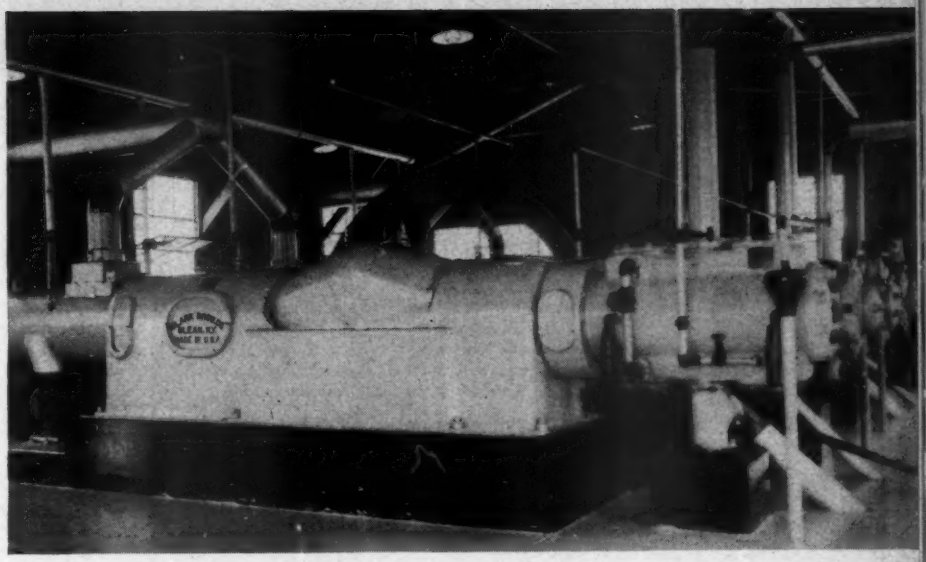
in one corner of the field and consequently it is possible to maintain the pressure in the formation under a portion of the property without driving the oil to other parts of the structure. The producing formation is the Yates sand which is rather clean in some sections of the lease and contains considerable cementing material in others. The sand averages approximately 60 ft. of gas and oil sand and about 23 ft. of very good oil sand which in the best wells is a fairly solid sand body but which in poorer wells is quite streaked with lime and shale.

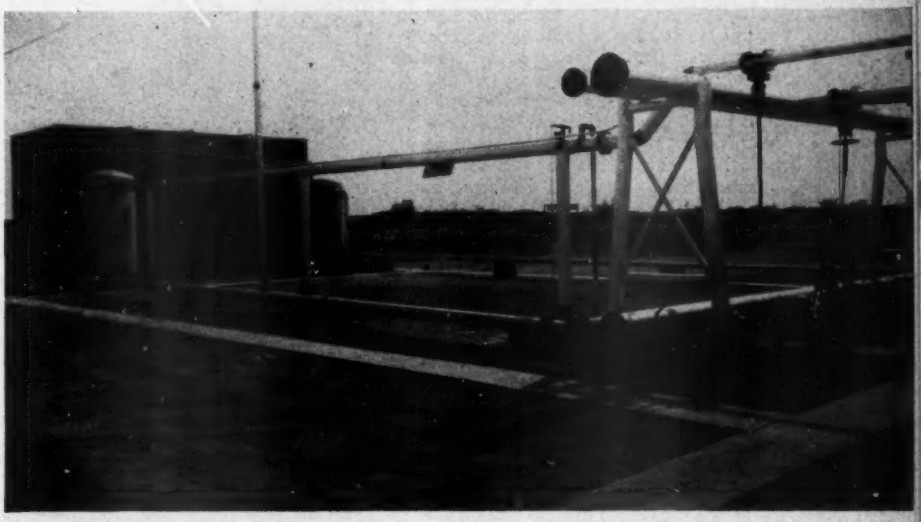
The 7-in. casing, in both the producing and the injection wells, is set at approximately 1,960 ft. with the total depth of the wells averaging about 2,095 ft. The formations in the portion of the hole left open are a solid lime plus the pay formation. Both the producing and the injection wells are equipped with 2-in. EUE tubing although the tubing in the injection wells is not used as the gas is introduced into the formation through the annular space. As soon as the pressure declines sufficiently the operators plan on pulling the tubing from the injection wells.

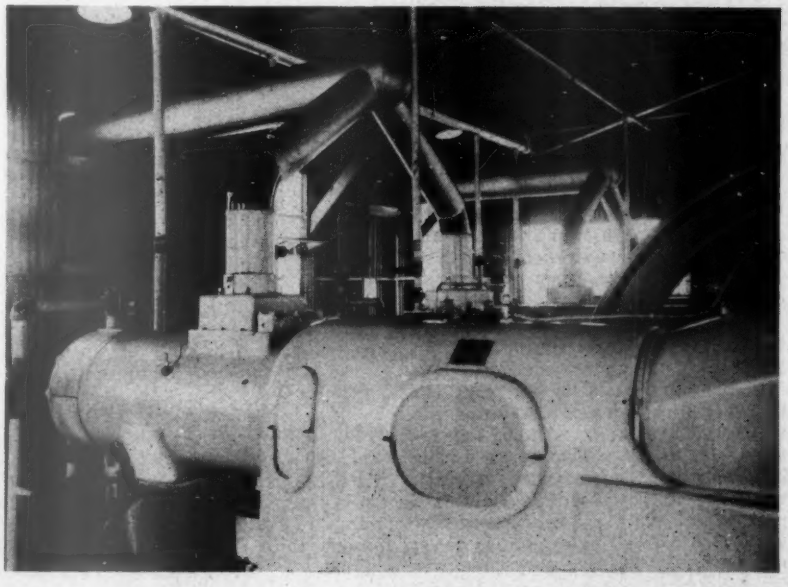
Modified Gas Cap

The field evidently has a modified gas cap as the gas-oil ratio of the wells was quite high at the time of completion running as much as 7,000 cu. ft. per barrel. With such a high gas-oil ratio there is more than sufficient gas for lifting purposes as well as for fuel for plant operation and injection.

Another indication that a gas cap exists in the field is the reaction of the producing wells nearest the injection wells and the behavior of the reservoir. One of the producing wells close to an injection well showed 20 per cent water before pressure maintenance was started. As the gas was returned to the formation the water production gradually declined until at present it is only a trace. Bottom-hole pressures likewise rose in the producing wells tested and in the area immediately surrounding the injection wells it is not a great deal less than it was originally. The average injection pressures have dropped less than







Top: Two 200-hp. horizontal, two-stage compressors used for providing high-pressure gas for both gas lifting and repressuring in the Payton pool in Ward County, Texas

Above: Simplicity and utility of piping system on small repressuring and gas-lift plant in the Payton field are illustrated by this photograph of exterior piping, low and high-stage scrubbers and atmospheric cooling tower

Left: Manifolding of the air intake to the engine cylinders of the compressors reduces the amount of piping and the number of air cleaners needed

View showing exhausts from compressor engine cylinders, air cleaners and high-pressure air tanks for cranking compressors. Different design of mufflers was due to desire to select the best. That at right produces least noise and back pressure

25 lb. in the past year, indicating the bottom-hole pressure is being satisfactorily maintained.

In the past 6 months, two of the wells which have been gas lifted for several years have shown a higher fluid level than formerly, indicating that the pressure is being built up in the reservoir around them. These wells are 1,320 ft. from the nearest injection well.

As a repressure project the operation has been quite successful and it is evident that the ultimate recovery on the lease will be considerably greater than the field average and that the lifting costs will be a great deal lower.

The 10 wells on the one lease produce 223 bbl. per day and the 6 wells on the other lease produce about 40 bbl. per day. The latter lease contains 80 acres in a long strip and is offset in such a manner as to create a competitive situation and consequently has little benefit from the repressuring program. The larger lease contains 252.4 acres and has the advantage of being reasonably isolated.

Closed System

As far as the gas-lift portion of the operation is concerned, it is a closed system, the gas used to produce the oil being returned to the plant for compression and use again. The only time any gas is lost is when several wells happen to produce simultaneously and the separator capacity is not sufficient to handle the gas. A small amount is then vented instead of being delivered to the compressors. This does not happen very often and the curing of this small operating deficiency would require a greater investment than the saving obtained would warrant.

Approximately 100,000 cu. ft. of gas is used daily as plant fuel, 270,000 cu. ft. per day is used for the gas-lift operation and 880,000 cu. ft. per day goes for maintaining the reservoir pressure. The discharge pressure from the plant at the present is around 830 lb. per sq. in. which is approximately the pressure required for injection.

Repressure well in Payton pool

Separator, tank, meter and pump used for testing wells in Payton pool

From the time injection was started to the present there has been a considerable variation over short periods of the pressure required for input. A complete and satisfactory explanation of this is still wanting.

The pressure required to operate the intermittent gas lifts runs from 280 to 310 lb. per sq. in. The gas for this purpose is taken from the high-pressure lines to the injection wells and regulated down to the desired pressure. It is also metered. The high-pressure lines to the injection wells are equipped with combination meters and motor-valve-operated regulators. Actually the system is based on supplying the necessary pressure-maintenance gas and then using the balance for the gas lift.

The wells are equipped with volume-controlled intermitters for operating the gas-lift mechanisms. The standard arrangement for the intermittent gas lifting of low-fluid-level wells is used. This consists of a bottom-hole operating valve located above a packer between the casing and tubing. Gas is admitted through the annulus and the ports in the valve to the accumulation chamber extending practically to the bottom of the hole and forces the production upward through a conductor pipe and through a second set of ports in the bottom-hole operating valve into the tubing and thence to the surface. The bottom-hole operating valve is actuated by the weight bar suspended on a wire line hanging from a piston controlled by the intermitter mechanism. Many of the gas-lift wells on the property have required no maintenance work since their installation.

Length of Interval

Length of the interval between injection of gas by the intermitters varies with the producing characteristics of the well. Low productivity wells operate on a 1-hour cycle while the better wells operate on a 20-minute cycle. Gas-lift wells account for approximately 225 bbl. of the total of approximately 265 bbl. produced daily on the two leases.

The compressor plant is modern in every respect and is housed in a sheet-steel building with concrete floor. All of the piping is either overhead or on concrete pillars immediately above the ground. Air intakes on the power end of each compressor are manifolded.

Both compressors are 200-hp., horizontal, two-stage compressors operating at 190 r.p.m. Intake from the separators is at 18 lb. with the low-stage discharge at 140 lb. and the high-stage discharge at 830 lb. with a maximum of 1,040 lb. The compressors were completely overhauled before being put into service.

Flow system of the plant is extremely simple as no effort is made to extract any gasoline and fluid collected in the scrubbers is injected into the input wells. The 8-in. gathering system brings the gas from the field separators to the intake scrubber where any condensate is removed. The gas after passing through first compression stage is cooled and scrubbed after which it is boosted to the final discharge pressure and cooled and scrubbed again. Very little trouble has been experienced with hydrate formation in the lines.

For testing the wells a special test unit has been mounted on a truck. This includes a separator, a small tank, an orifice meter and a small pump. Both well productivity and gas-oil ratio data can be easily obtained.

Larkin's "NEOSEAL" PACKER is Dependable

BACKED BY 39 YEARS
PACKER BUILDING
EXPERIENCE

Larkin's "NEOSEAL" Hook Wall Pumping Packer accomplishes the job it was designed to do . . . without fail and with minimum trouble.

It sets easy. It packs off positively. You can easily remove it from the hole because the neoprene packing element steel ring shoulders on the mandrel and pulls the rubber from the top instead of pushing it from the bottom. This, together with the slip arrangement, allows you to raise or lower it without removal from the hole.

OTHER LARKIN PACKERS

Larkin builds a complete line of packers, including wall, casing anchor, tubing anchor, bottom hole, liner setting and cave types.

Simple means of by-passing when running in flowing well, or bleeding off fluid to avoid wet tubing job.

LARKIN

LARKIN PACKER CO., INC.
St. Louis, Mo.
WAREHOUSES: Houston, Corpus Christi, Odessa, Shreveport, Tulsa, Great Bend, Salem.
EXPORT: 74 Trinity Place, New York City

PIPE-LINE SUGGESTIONS

Slides for Holding Tank Tables

NUMEROUS arrangements have been devised for holding tank tables so that they may be conveniently accessible. At the office of a large crude-oil trunk-line station, a solution of the problem has been reached by having tank tables framed on wooden slides installed as part of the desk where messages are sent and received by telegraph and telephone. The use of slides insures that tank tables are aways in order and that they are protected against the kind of wear which comes from handling. When not in use they can be slid back out of sight where they are not in the way to interfere with work being done on the desk.

Locking Device for Valve Wheels

IN an area where valve wheels had been stolen frequently, a major natural-gas company installed a locking device which locks the wheel and which completely surrounds the valve mechanism.

Improvised Boom Tractor Equipment Meets Emergency Situation

IN taking up some old lines this year, one contractor found that in order to meet an emergency situation he had to improvise boom tractor equipment with available materials. The boom itself is made of two pieces of pipe, joined together. While this served his immediate needs, it is not reported that such equipment would be suitable except in temporary emergency situations.

Device for Checking Position Of Engine Flywheels

A SIMPLE device has been used to assist in checking engine flywheels. This consists of an indicating arm made of a small piece of nonsparking angle metal. From the place where it is fastened on the side of the engine it protrudes so that the tip of arm is close to the flywheel when it is properly aligned and rotating in the correct position. Just enough clearance is allowed to avoid having the tip of the indicating arm touch the flywheel. If the flywheel develops a slight wobble it will rub against the tip of the arm. By observing this, operators are informed that adjustments should be made.

PLANT PRACTICES

Twin Instrument Mounting for Dual Control

A TWIN instrument mounting for a dual control to a compressor in one refinery is attached to the air lines leading from the compressor. Brackets welded to each side of the discharge in the shape of an A-frame, leaning outward from the base at an angle of about 45°, supply an adequate seat for the weight of the appliances. The piping to which the instruments are attached supplies the horizontal braces, and straps attached to the top of the equipment prevent damaging vibration.

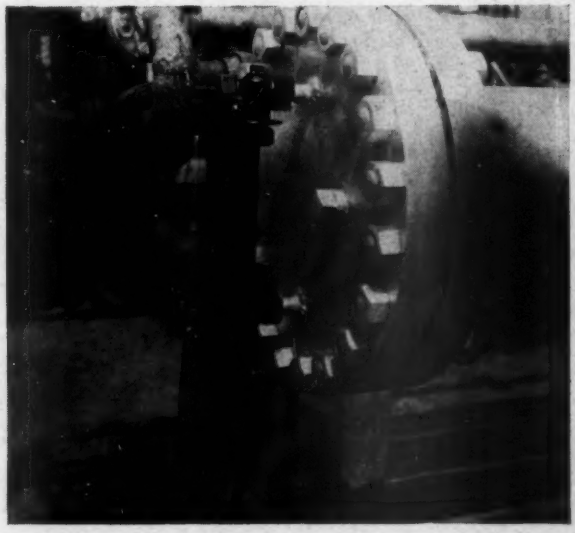
Electric Control for Refinery Gate

THE drive for an electrically operated vehicle gate at a Kansas refinery makes use of a differential unit salvaged from an old automobile. Axles were cut off leaving only a few inches protruding on each side of the differential housing. The unit is mounted on the gate post on the inside a short distance above the ground with the axles vertical. A circular plate with a radius equal to the distance from the center of the axle to the

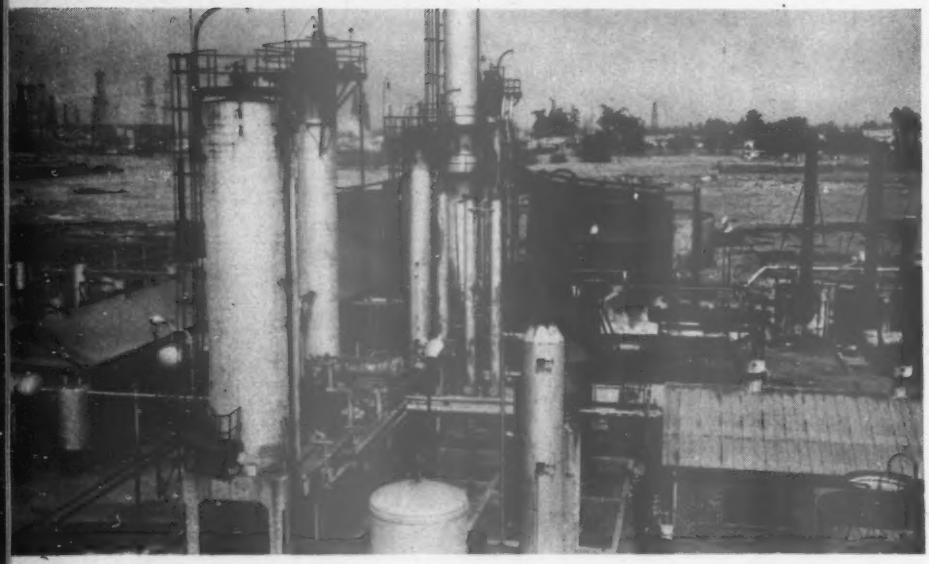
gate frame is welded to the gate frame at a point on its perimeter, and provides the driving connection. This plate in turn is supported on a slightly smaller circular plate welded on top the axle at its midpoint. Turning of the secondary plate by the axle engages the top plate which swings the gate open or shut. There is sufficient delay in the engagement that a rod connecting the secondary plate and the latch at the outer end of the gate has time to unlatch the gate before the plate swinging gate is turned. Power is supplied by a ¼-hp. motor which operates through a worm gear fitted on the end of the short drive shaft to the differential unit. The worm gear was salvaged from an automobile steering post turning unit. It provides a smooth and rapid opening and closing of the gate. The gate swings on a pivot and stops automatically at its maximum open position and at its closed position by means of power cutout switch controlled by two contact points which are contacted by a short arm attached to the gate at the desired positions. Operation of the gate is by remote control in the gateman's house.

Protector for Glass Liquid-Level Gage

THE glass liquid-level gage at the end of this caustic soda treater was exposed to breakage. Lacking regular protective devices the operators used half of a short section of small pipe split lengthwise. This was hung from the top of the fitting over the front of the glass. While covering and protecting the glass from three sides it is placed a sufficient distance outward to permit easy reading of the fluid level from the side.



Bottoms From Rerun Pressure Distillate Converted to Industrial Oils



In the foreground are the columns which are employed as clay towers and rerun equipment, with twin furnaces at extreme distance, where polymers are refined for special foundry purposes when making castings

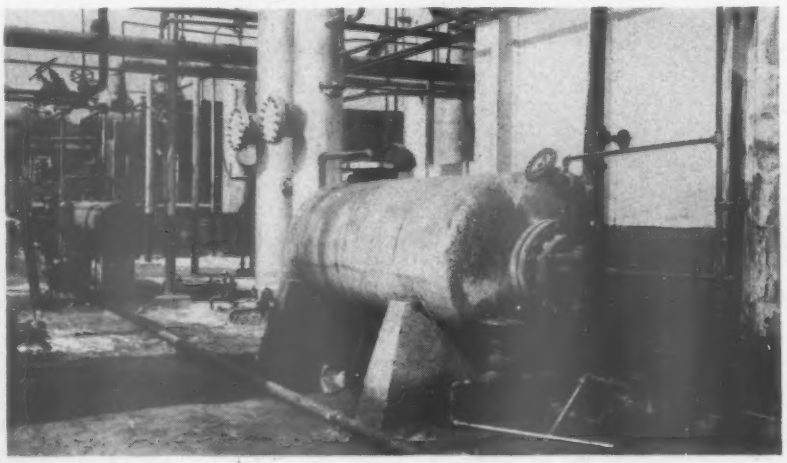
Manufacture of core oil used in metallurgical processes is conducted in a refinery which uses home-made equipment through which it runs pressure distillate. Corrosion and tube deterioration has also been eliminated.

A MEDIUM-SIZED refinery employing a cracking process with facilities for rerunning the pressure distillate after contact in the liquid phase with fuller's earth or activated clays has assembled a plat-constructed unit to reduce the rerun bottoms to specifications as a type of core oil which is employed in certain metallurgical processes. This refinery was built and designed to operate on a charge of fresh crude, reduced crude, gas-oil or kerosene distillate, depending largely upon the availability of materials for cracking, but regardless of the type of charging stock processed, the result consists of fuel oil, cracked gasoline—or pressure distillate—and refinery gases.

Two separate furnaces are employed using a common stock with connecting breeching, with both transfer lines entering a reaction chamber common to both heaters. The flow of the commodity from the heaters through the reaction, flash and fractionating columns is conventional, with a side product removed from the main fractionating column as the charge to the light-oil furnace. Cracked gasoline is removed from the overhead vapor line and condensed as completely as practicable to furnish a commodity to be treated in the liquid phase in a single clay-contact column which follows immediately in the process directly from the pressure-distillate-accumulator drum. The stream of cracked gasoline flows from the clay column to a vertical heater and from that unit it passes through a fractionator to obtain the desired end point. The vapors of the required fractions of the raw pressure distillate charged to this portion of the plant pass in the conventional manner overhead to atmospheric condensers with the resulting condensate pumped continuously to a separate unit for doctor treating and finishing as automobile motor fuel.

Disposal of Undesired Fractions

The fractions not desired to be included in the overhead stream from the rerun column are withdrawn from the base of the tower and contain the gums, polymers and other compounds acted upon by the clay and separated by rerunning. This commodity contains the charge to the special equipment erected to produce the casting oils employed by the metallurgical establishments located east of the Mississippi River. The specifications, in part, stipulate that not more than 12 per cent by volume shall distill over at a temperature of 460° F. A

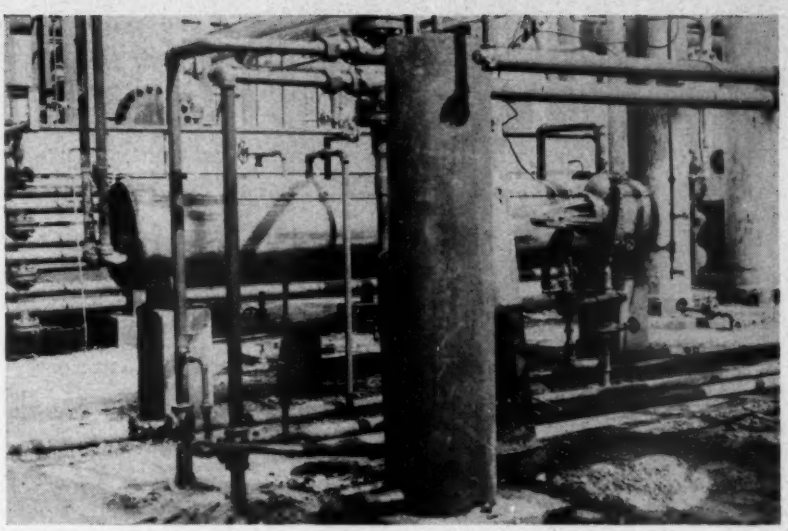


Accumulator for reduced polymers which are pumped from this vessel to storage to await shipment by tank car to destination

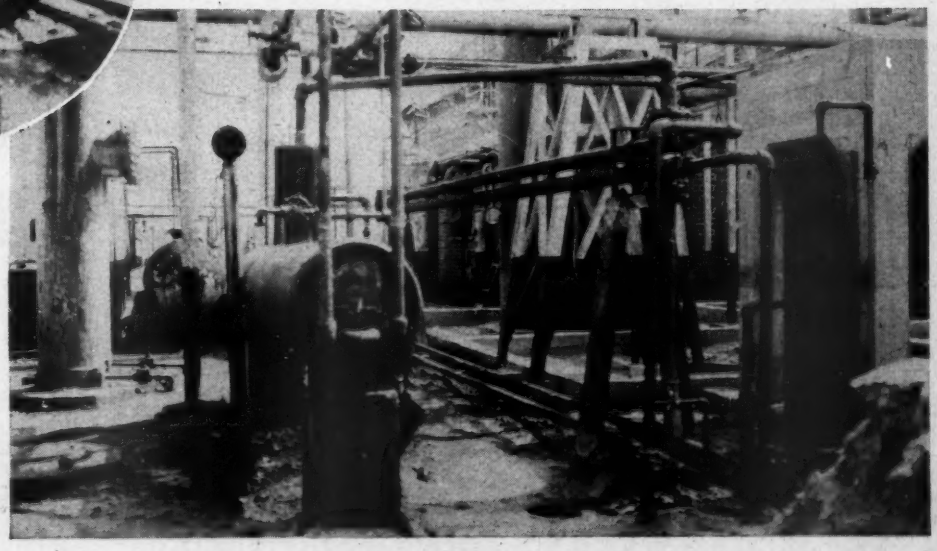
full-range distillation is physically impossible with ordinary laboratory equipment since approximately half of the sample will precipitate, or change to coke when heated in a flask when running.

This equipment built to manufacture the specialized core oil is practically 100 per cent home-made—due to the scarcity of fabricated vessels—and was assembled from such material as might be obtained from junk yards and the refinery surplus stores. The rerun equipment for processing the bottoms is as simply constructed as possible and contains an evaporator—or reboiler—with liquid-level controls, a vapor condenser, commodity cooler, accumulators and the necessary pumps for handling liquids. The reboiler is a small cylindrical vessel equipped internally with four 2-in. pipe tubes welded through one head only permitting the inside returns to float freely, and is set upon concrete piers immediately below the refinery heat-medium lines leading from the main fractionating column of the cracking plant to the usual preheaters, reboilers and other vessels employing this type of heat transfer. The bottoms from the rerun column flow through a float control valve directly to the commodity reboiler—or evaporator—which is operated essentially at atmospheric pressure and with a process temperature of 575° F. The temperature of the material in process in the evaporator is controlled by the quantity of heat-medium oil flowing through the tubes in the vessel. Hand control is employed to control the temperature since all flows through the refinery and succeeding processes are comparatively constant in volume and temperature which prevents any material fluctuation in the quantity of bottoms piped to the evaporator. It has been observed that, with a temperature of 575° F. within the evaporator, approximately 50 per cent of the rerun bottoms will be converted to the specialized product, while the other approximate 50 per cent will vaporize. The liquid, removed constantly from the evaporator, flows through pipe tube coolers to a receiver from which it is pumped to storage. The quantity of this product is approximately 25 bbl. per day of 24 hours.

Before this unit was installed, the entire bottoms from the rerun column were returned to the fractionating column of the cracking plant where the bulk of them were pumped with the light cracking stocks to the light-oil furnace. The corrosive compounds contained in the whole bottoms were so active that great damage was encountered in the tubes and fittings. Separating these bottoms has produced two valuable results. The first, and perhaps the more important is the practical elimination of corrosion and tube deterioration, while the second is the market which consumes all of the specialized product produced by the bottoms separator. The entire unit is almost automatic and requires a minimum amount of time from the plant operators who only need to inspect the flow frequently after the separating equipment has been placed on stream and reaches its equilibrium.

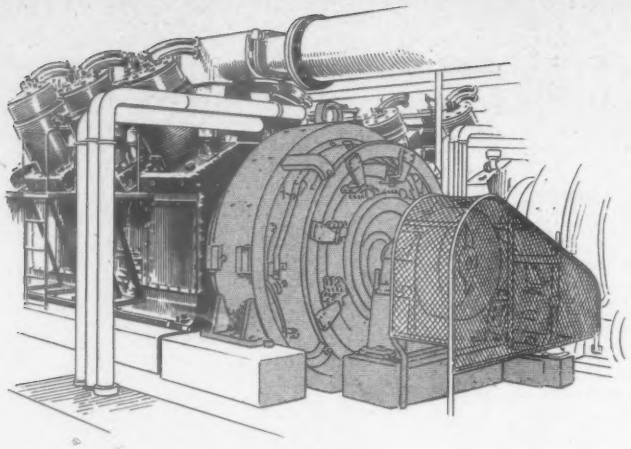


Horizontal vessel in background equipped with high-level controls to maintain definite height of commodity above heating coils



Above: Type of connections used to insert heating coils in horizontal vessel for the reduction of cracking-plant polymers

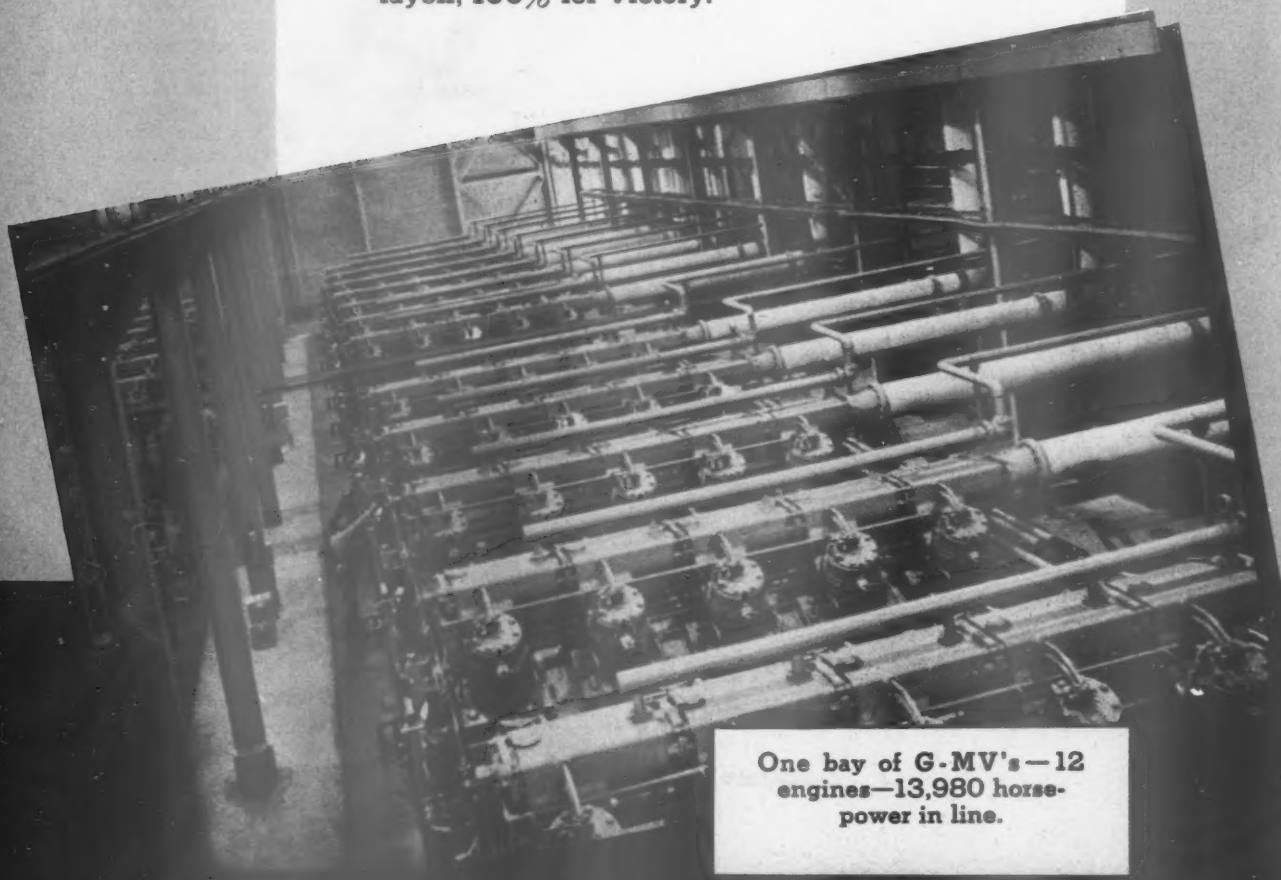
Right: Horizontal heat exchanger where a sufficient quantity of plant heating oil from the fractionating column is circulated to reduce the polymers to the required specifications



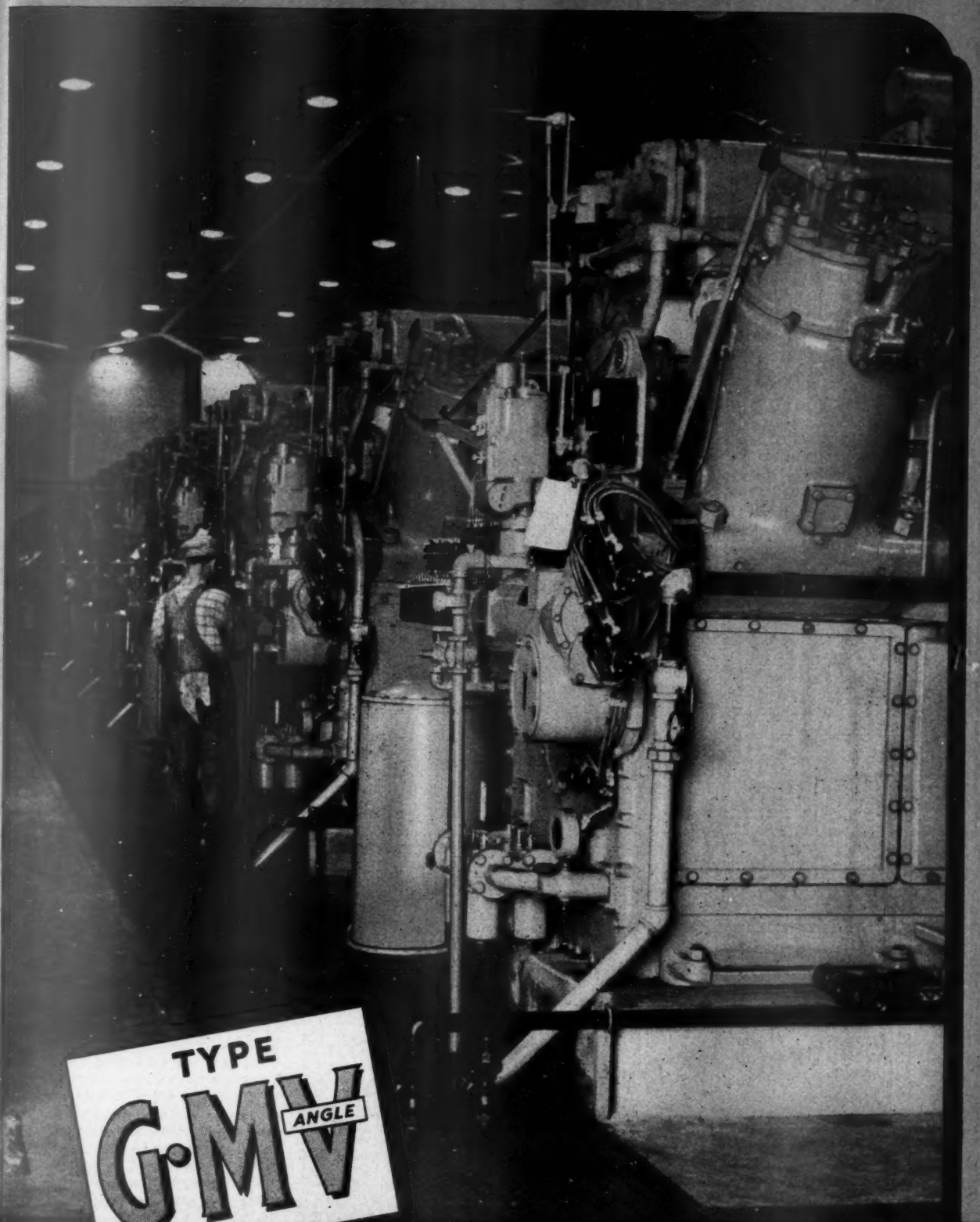
50 Cooper-Bessemer engines in one installation . . . driving generators that produce the tremendous volume of electric power required for the government's famous Project X.

This is the largest installation of G-MV engines ever made — 58,250 horsepower.

Each is a 10-cylinder, 1,165 hp. unit — gas-driven, fully convertible to diesel. Quiet, efficient, dependable, they are running continuously, month after month, with never a slowdown or a layoff, 100% for Victory.



One bay of G-MV's — 12 engines—13,980 horsepower in line.



by **Cooper-Bessemer**

MOUNT VERNON, OHIO AND GROVE CITY, PENNA.

Houston, Dallas, Greggton, Pampa and Odessa, Texas Tulsa Shreveport St Louis Los Angeles Seattle, Wash
New York Washington Bradford, Pa Parkersburg, W Va. Gloucester, Mass.

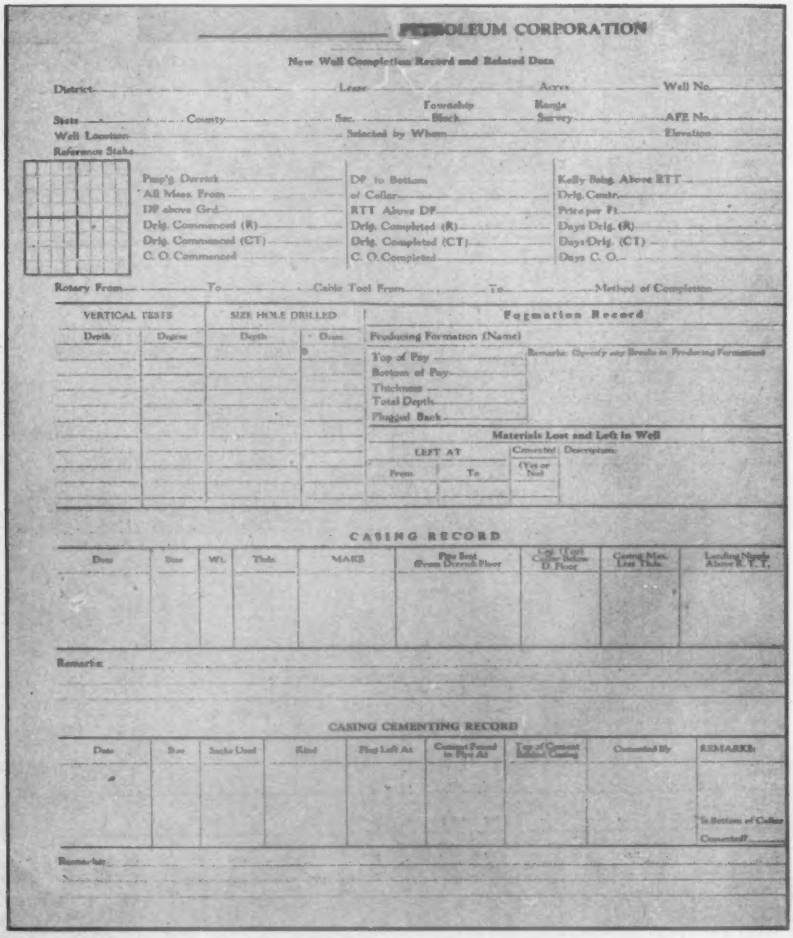
Completion Records Aid Conservation Of Strategic Materials in Wells

by Vic E. Baum *

THE emergency has forcibly brought to the attention of all operators the need for records that will reflect true facts and conditions of wells. Heretofore completion information from a production point of view has been almost wholly neglected. Most of the larger companies who maintain geological departments will make detailed records of geological markers and cores taken and will carefully select a pipe seat, generally taken from the derrick floor. Later when production problems arise (the rotary derrick has been moved away) the actual pipe seat cannot be found within several feet of the original recorded one.

*Consulting well completion engineer, Wichita, Kans.

A completed well is generally put on production without regard for the possibility of future workovers. By the time these are necessary, many details involved in the original completion have been forgotten or lost. In this article a form is presented which covers all of the details likely to be needed for future reference.



_____ PETROLEUM CORPORATION

New Well Completion Record and Related Data

District _____ Lease _____ Acres _____ Well No. _____

State _____ County _____ Sec. _____ Township _____ Block _____ Range _____ Survey _____ AFE No. _____

Well Location _____ Selected by Whom _____ Elevation _____

Reference Stake _____

Pmp'g. Derrick _____ DF to Bottom _____ Kelly Bshg. Above RTT _____

All Meas. From _____ of Cellar _____ Drlg. Contr. _____

DF above Grd. _____ RTT Above DF _____ Price per Ft. _____

Drlg. Commenced (R) _____ Drlg. Completed (R) _____ Days Drlg. (R) _____

Drlg. Commenced (CT) _____ Drlg. Completed (CT) _____ Days Drlg. (CT) _____

C. O. Commenced _____ C. O. Completed _____ Days C. O. _____

Rotary From _____ To _____ Cable Tool From _____ To _____ Method of Completion _____

VERTICAL TESTS		SIZE HOLE DRILLED		Formation Record
Depth	Degree	Depth	Diam.	Producing Formation (Name)
				Top of Pay — Remarks: (Specify any Breaks in Producing Formation)
				Bottom of Pay
				Thickness
				Total Depth
				Plugged Back

Materials Lost and Left in Well

LEFT AT		Cemented (Yes or No)	Description
From	To		

CASING RECORD

Date	Size	Wt.	Thds.	MAKE	Pipe Bsd. (Feet Above Derrick Floor)	Cap. (Feet Cut Below D. Floor)	Casing Mfgr. Less Thds.	Landing Nipple Above R. T. T.

Remarks: _____

CASING CEMENTING RECORD

Date	Size	Sacks Used	Kind	Plug Left At	Cement Found in Pipe At	Top of Cement Behind Casing	Cemented By	REMARKS
								Is Bottom of Cellar Cemented?

Remarks: _____

The depth of setting a reference stake in concrete out away from the well and making a record of the description of the stake and its exact location with reference to the well has been inaugurated. That is to say, for example: 2-in. by 5-ft. line pipe cemented approximately 60 ft. southeast of well; derrick floor 2.90 ft. above ground at stake. One can instantly see that by sighting on a level over the top of this stake the original derrick floor position can be accurately assumed, which might possibly be 10 ft. above present grade at the well.

This writer knows of any number of cases where someone's memory was trusted for the height of the derrick floor above the ground; in most cases this would have to be altered because of grading work incident to filling the rotary pits and the installation of pumping equipment, done subsequent to the pipe-setting operation. In one case it was necessary to log a well electrically to ascertain the actual pipe seat, which was found to be 14 ft. from where it was thought to be.

Vertical tests.—Straight-hole tests become very important to a production man at certain times. The depth and deviation from vertical where tests are made should be recorded as often as is dictated by the size and weight of the casing to be used. Most everyone realizes that small-diameter casing will bend and deflect around a smaller radius than larger casing Therefore, the smaller the oil string to be used, the more carefully should deviation from vertical be watched. Larger pipe will not go down a hole that has the same vertical variations as a hole where smaller pipe will run, even though the hole sizes are of the same proportion to the casing size. A crooked hole will wear out lots of pumping equipment and will mean much lost production in time.

Size of hole drilled.—Hole sizes and reduction points must be recorded accurately to guide the production man in completion and workover operations to follow. Without knowing the hole size at any point, remedial work can only be carried on after

A 100% RECORD

Awards on May 8th, 1943 to two plants in Kenosha, Wisc., completed this 100% record for The American Brass Company.

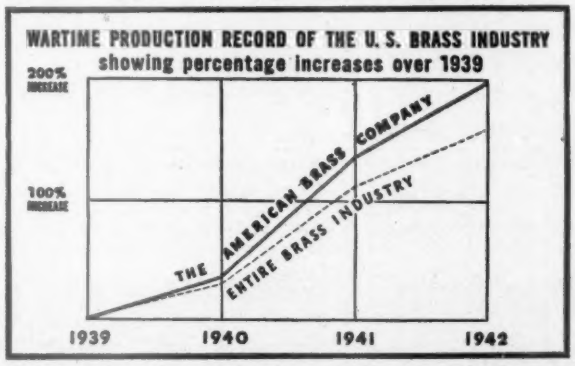
ALL TEN AMERICAN BRASS CO. PLANTS IN U. S. A. HAVE EARNED RIGHT TO FLY ARMY-NAVY "E" FLAGS

This is the story in terms of war production

Our Connecticut plants were among the first in the brass industry to receive the coveted "E" Award for outstanding production of war materials. Since then *all* our plants, including those in the States of Michigan, Wisconsin and New York, have been similarly honored.

As the largest fabricator in the copper and brass field, The American Brass Company is keenly aware of its responsibility and its opportunity to serve the cause of the United Nations.

Since 1939, production has been tripled, with virtually every pound today going for war purposes.



This chart*, based on 1939 peacetime production, shows the rapid swing into all-out war production, both by the copper and brass fabricating industry and The American Brass Company (not including Government-owned plants). All-time production records have been continually broken ever since the National Defense Program was initiated in 1940.

*Based on compilations of The American Bureau of Metal Statistics

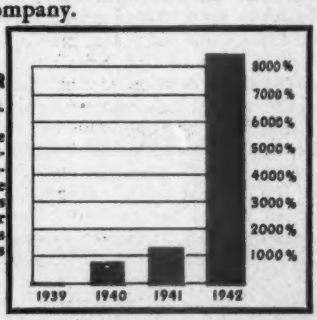
This record was accomplished by close cooperation between management and labor . . . careful planning for rapid conversion to wartime operations . . . intensive training of new personnel . . . plus efficient utilization of existing and new plant equipment.

Detailed figures, of course, cannot be revealed, but The American Brass Company is consistently breaking all previous volume records. In addition to its U. S. plants and that of a Canadian subsidiary, Anaconda American Brass Ltd., the company's production also embraces three plants operated for the United States and Canadian Governments.

Shipments this past January were the largest in the company's history. March exceeded January. The first quarter of '43 was by far the greatest tonnage quarter in the records of the company.

PRODUCTION OF COPPER ALLOYS FOR AMMUNITION by The American Brass Co.

This chart shows the vast increase in production of copper-base alloys directly earmarked for ammunition in plants operated by The American Brass Company. This is one of the most vital needs for copper and brass. Tremendous quantities are required for all types of ammunition.



The American Brass Company is proud indeed that all the plants it operates in the U. S. A. have won the honor of flying the Army-Navy "E" for excellence in production. But it is even prouder of the organization and the will-to-produce that have made this record possible . . . *and will keep it going.*

THE AMERICAN BRASS COMPANY

ANACONDA

Subsidiary of *Anaconda Copper Mining Company*

BUY ALL THE BONDS YOU CAN AFFORD . . . TURN IN ALL THE SCRAP YOU CAN FIND

spending much time and money to prove unknown conditions.

Casing record.—The size, weight thread and condition of the casing should be recorded. When the pipe has been set a measurement should be recorded showing the bottom of the casing shoe from the derrick floor. Because drillers will generally show the landing nipple in the pipe tally the measurement from the top of the casing collar below the derrick floor should be shown, together with the height of the rotary table top above the derrick floor and that part of the landing nipple above the rotary table top. With these dimensions anyone can take the pipe tally and the geeological report and ascertain exactly how the pipe was set and where the casing seat is after making allowances for the elongation of the casing string, less the buoyancy it would have in the drilling mud existing at the time of setting casing.

Casing-cementing record. — Since there will probably be more than one cementing job on each well, the casing-cementing record should commence with the size of casing that is being cemented, followed by the number of sacks of cement used, the kind of cement used and then the point at which the plug was left, followed by the depth at which cement was found in the casing.

From handbooks it will be seen that one could take the over-all casing measurement and compute the amount of cement that was left in the casing and by reference to the size of the hole drilled, the top of the cement behind the casing can be theoretically ascertained. Generally, there will be known, sufficient for estimating purposes, the fluid loss of that part of the hole which will be filled by cement so that the theoretical top of the cement behind the casing can be adjusted to indicate the actual top of cement behind the casing. It is this writer's opinion that for the purpose of the record the theoretical top of the cement behind the casing should be shown and in the remarks column should appear any notation that would adjust the actual top of the cement behind the casing, so that in abandoning the exact amount of recoverable pipe would be known, other characteristics being considered.

Generally it is well to note if the bottom of the collar has been cemented so that in the event pumping equipment is to be installed the constructor will know if a compressive load may be taken on this solid base.

Liner record.—Although few production men like to run liners, it is sometimes necessary and because a liner can be so troublesome a detailed record should be made of the size, weight, thread, and length, where it was set (from and to) and the top of the liner inside the casing. If cemented, how many sacks of cement were used, and, under remarks, all details should be given as to shoes, perforations, screens, hangers, etc.

Braden head record.—Of recent years the practice is fast becoming universal to braden head the oil string to the surface casing as this will give control where pressure is required for squeezing, where remedial work becomes necessary. The most important thing to know about a braden head is the type, the number of outlets and their size, indicating threads of the port openings. With this information, a remedial job can be planned and information given to those concerned so that all fittings, threads, etc., will fit the braden head. A braden head is cheap insurance against the time when pressure control is needed between the surface casing and the oil string.

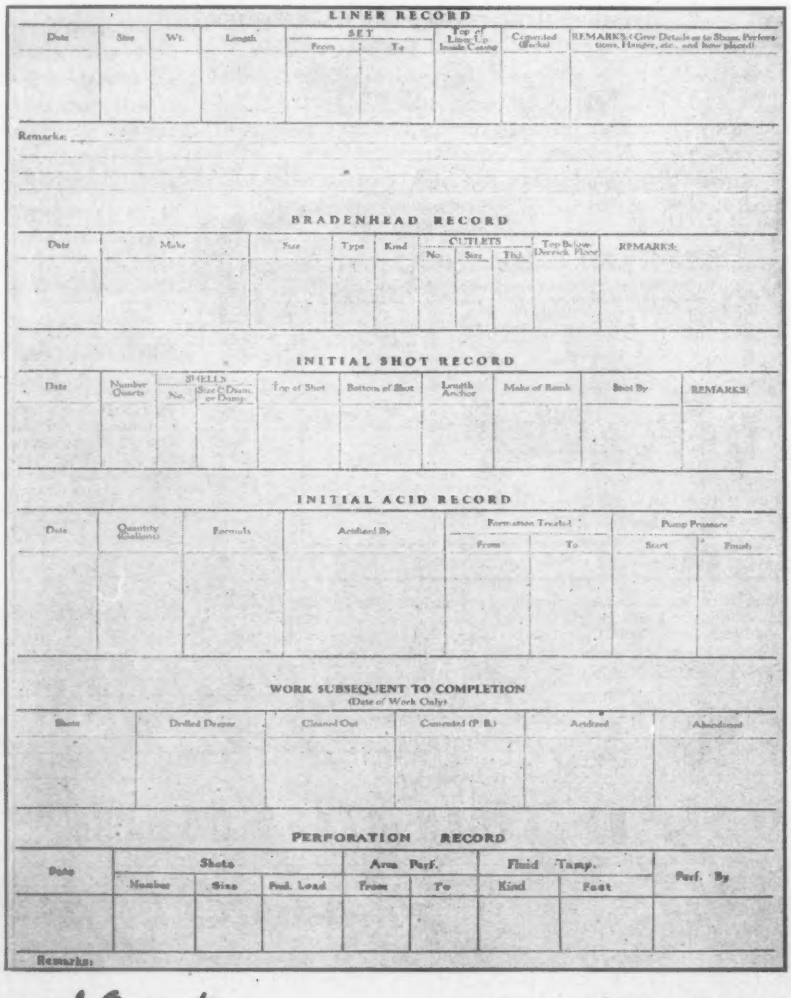
Initial shot record. — For general reference it is sufficient to record the date shot, the number of quarts used, the number of dumps or shells, the size and diameter of shell (liquid or dumping shell), top of shot, bottom of shot, length of anchor, make and kind of time bomb—that is to say the number of hours for which the time bomb was set. A detailed record of the shot as actually loaded in the hole will be treated at another time.

Initial acid record.—For general reference it is sufficient to record the date of acidization, quantities in gallons used, the formula, who did the acidizing, the formation treated (from and to) and the pump pressure start and finish.

A detailed record should be drawn up representing every phase of the operation and this will also be treated separately.

Perforating casing. — Under the heading "Shots," the number, size and powder load should be shown. ("Number" being the quantity of shots put off in each separate area; "size" the diameter and "powder load" the grams of powder fired in each shot.) The powder load is important for the reason that where several thicknesses of steel and cement are to be pierced, more grams of powder are required to penetrate beyond the mud

(Continued on Page 52)



LINER RECORD

Date	Size	Wt.	Length	SET From	SET To	Top of Liner Up Inside Casing	Cemented (Sacks)	REMARKS (Give Details as to Shoes, Perforations, Hanger, etc., and how placed)

Remarks:

BRADENHEAD RECORD

Date	Make	Size	Type	Kind	OUTLETS No.	OUTLETS Size	OUTLETS Thd.	Top Below Derrick Floor	REMARKS

INITIAL SHOT RECORD

Date	Number Quarts	SHELLS No.	SHELLS (Size & Diam. or Dump)	Top of Shot	Bottom of Shot	Length Anchor	Make of Bomb	Shot By	REMARKS

INITIAL ACID RECORD

Date	Quantity (Gallons)	Formula	Acidized By	Formation Treated From	Formation Treated To	Pump Pressure Start	Pump Pressure Finish

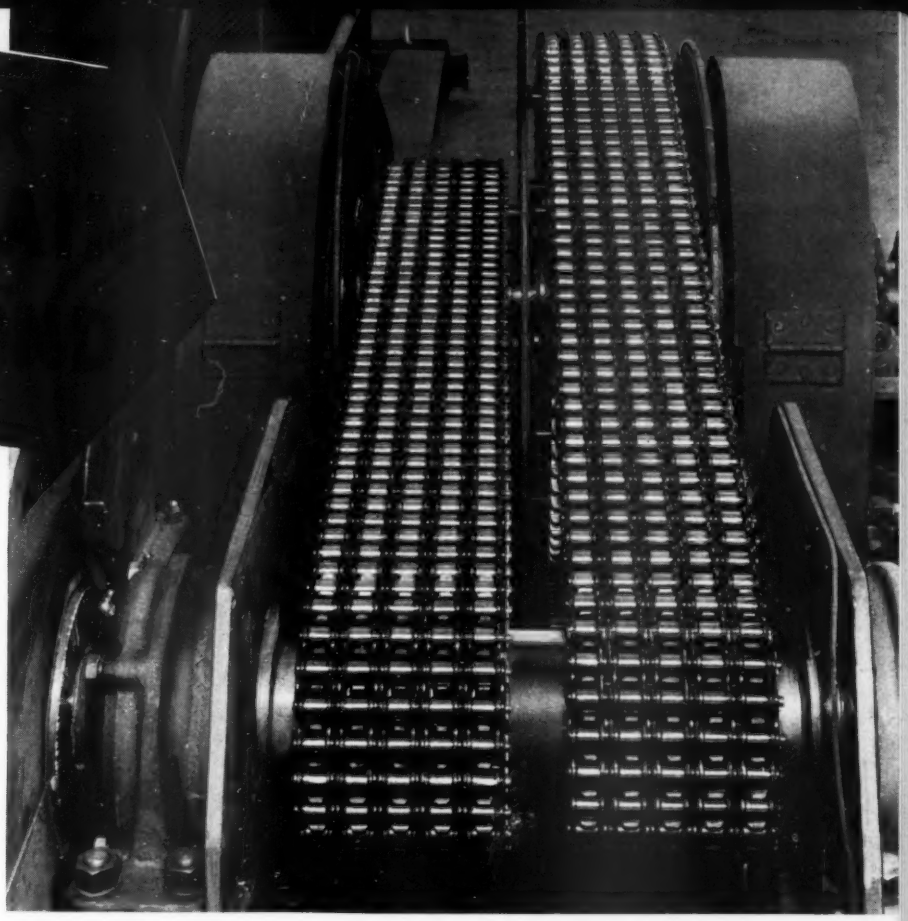
WORK SUBSEQUENT TO COMPLETION
(Date of Work Only)

Shots	Drilled Deeper	Cleaned Out	Cemented (P. B.)	Acidized	Abandoned

PERFORATION RECORD

Date	Shots Number	Shots Size	Shots Pwd. Load	Area Perf. From	Area Perf. To	Fluid Temp. Kind	Fluid Temp. Feet	Perf. By

Remarks:



"Never Used a Foot of Any Roller Chain but DIAMOND In over 17 Years"

Two-speed pump drive on Cardwell Slush Pump—consisting of two five-strand Diamond Roller Chain Drives

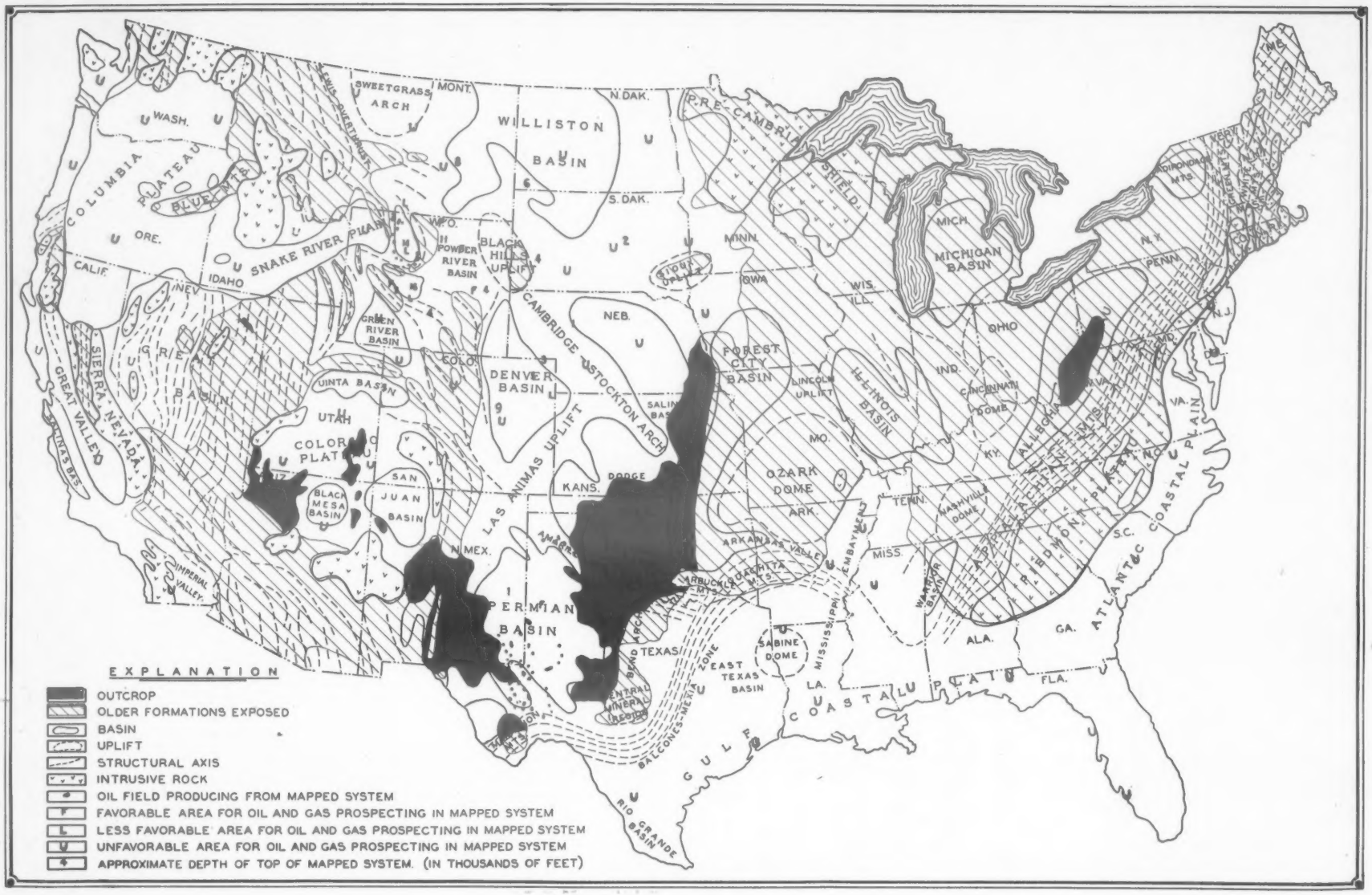
● Oil field machinery builders probably are in as close contact with users of their equipment as any other class of manufacturer. Developments and advanced designs are a result of their knowledge of field performance.

Among the leading builders, Cardwell Manufacturing Co., Inc. is typical. And equally typical is their extensive use of DIAMOND Roller Chain Drives. As proof of the uniformly satisfactory performance of Diamond Chains, Mr. H. W. Cardwell, President, writes: "We have never used a foot of any other make of roller chain over a 17-year period."

For many years, in oil fields all over the world, Diamond Drives have demonstrated their great strength, durability and efficiency. Experienced operating men are well acquainted also with their inherent elasticity for withstanding shock loads, and their long life—due to sharing the load over many sprocket teeth.

The use of Diamond Roller Chains is evidence of sound engineering and good machinery design. DIAMOND CHAIN & MFG. CO., 475 Kentucky Ave., Indianapolis, Ind. Tulsa Office: 2238 Terwilleger Blvd.

Permian


WASH.
ORE.
CALIF.
IDAHO
NEV.
UTAH
COLO.
ARIZ.
N.MEX.
MONT.
N.DAK.
S.DAK.
WYO.
NEB.
KANS.
OKLA.
TEXAS
MINN.
IOWA
MO.
ARK.
LA.
MISS.
ILL.
WIS.
MICH.
IND.
OHIO
KY.
TENN.
ALA.
GA.
FLA.
S.C.
N.C.
VA.
PENN.
N.Y.
W.VA.
MD.
N.J.
COLUMBIA PLATEAU
BLUE MTS.
SNAKE RIVER PLAIN
SWEETGRASS ARCH
WILLISTON BASIN
BLACK HILLS UPLIFT
POWDER RIVER BASIN
GREEN RIVER BASIN
UINTA BASIN
DENVER BASIN
CAMBRIDGE-USTOCKTON ARCH
LAS ANIMAS UPLIFT
SALINA BASIN
FORREST CITY BASIN
LINCOLN UPLIFT
ILLINOIS BASIN
OZARK DOME
ARKANSAS VALLEY
NASHVILLE DOME
CINCINNATI DOME
MICHIGAN BASIN
PRE-CAMBRIAN SHIELD
ADIRONDACK MTS.
ALLEGHANY PLATEAU
APPALACHIAN MTS.
PIEDMONT PLATEAU
ATLANTIC COASTAL PLAIN
COLORADO PLATEAU
BLACK MESA BASIN
SAN JUAN BASIN
PERMIAN BASIN
ARBUCKLE MTS.
OUACHITA MTS.
EMBAYMENT
WARRIOR BASIN
SABINE DOME
EAST TEXAS BASIN
MISSISSIPPI
CENTRAL MINERAL REGION
BALCONES-MEXIA ZONE
GULF COASTAL PLAIN
RIO GRANDE BASIN
SIERRA NEVADA
GREAT VALLEY
SPRINGS MTS.
IMPERIAL VALLEY
EXPLANATION
OUTCROP
OLDER FORMATIONS EXPOSED
BASIN
UPLIFT
STRUCTURAL AXIS
INTRUSIVE ROCK
OIL FIELD PRODUCING FROM MAPPED SYSTEM
FAVORABLE AREA FOR OIL AND GAS PROSPECTING IN MAPPED SYSTEM
LESS FAVORABLE AREA FOR OIL AND GAS PROSPECTING IN MAPPED SYSTEM
UNFAVORABLE AREA FOR OIL AND GAS PROSPECTING IN MAPPED SYSTEM
APPROXIMATE DEPTH OF TOP OF MAPPED SYSTEM. (IN THOUSANDS OF FEET)

OIL ZONES OF THE UNITED STATES

Permian

(Compiled by The Oil and Gas Journal)

PRINCIPAL PRODUCING HORIZONS:

Sandstones: Chickasha gas sand and shallow oil sands in southern Oklahoma. Delaware, Yates and other sands flanking limestone highs in the Permian basin.

Limestones: Gas and oil pays in the Wichita-Albany in the Texas Panhandle and equivalent horizons in the Hugoton gas field of Kansas; porous zones in the Clear Fork, San Andres and Whitehorse of the Permian basin; Embar formation of Wyoming.

DISTRIBUTION OF PRODUCING AREAS: Permian production in the United States is confined to three districts of which the Permian basin of Texas and New Mexico and the Amarillo-Hugoton area are the most important. The producing horizons here represent the final stages of filling of a basin by marine sediments and they are overlain by a salt-anhydrite series with red beds superimposed. The producing limestones and associated clastics become progressively younger from north to south with limestones and dolomites with associated granite wash of **Wichita-Albany** age forming the principal pays in the Panhandle and equivalent members of the **Chase** and **Wellington** formations producing gas at Hugoton.

The **Clear Fork** is not as yet an important pay but forms the deep horizon at Wasson and Sharon Ridge and also produces in the Westbrook field on the eastern rim of the basin and in the newly discovered Lubbock field.

The principal producing horizon in the central part of the basin is the **San Andres** limestone in which most of the Ector-Andrews County production is found. It also produces in the Slaughter and Seminole fields and is the principal pay at Wasson. In the eastern part of the basin, the San Andres produces in the Iatan and Chalk-Settles fields. It also forms the deeper pays in New Mexico. Still farther south and west, the **Whitehorse** group is the main producing horizon in Yates, the Crane-Upton and Winkler-Ward-Pecos county trends and in New Mexico. Many of the fields producing from the Whitehorse limestones and dolomites are flanked with impure limes and with sands which produce much oil, particularly in Winkler County, Texas, and Lea County, New Mexico.

On the west flank of the Fort Stockton high production is obtained from the **Delaware** sand which is equivalent to the lower part of the San Andres.

The last stages of basin filling also provide some producing sands in the Red River district where Permian production is found in Velma and Milroy. This is continuous with Permian production in the Anadarko basin, mainly at Robberson and in the Chickasha gas field.

In Wyoming, particularly around the margin of the Big Horn basin, the **Embar** limestone of Permian age produces important quantities of black oil.

EXTENSION INTO OTHER AREAS: The fact that most Permian deposits in other parts of the United States are of continental origin practically precludes the possibility of finding additional areas producing from rocks of this system. There is, however, an excellent possibility of extending known producing belts for considerable distances. In many of the West Texas fields there has been little drilling below the uppermost producing horizon so that deeper Permian pays may be found to extend south of their present known limits. At the same time, there is a great area between the West Texas and Panhandle fields and extending into New Mexico where little prospecting has been done. It is improbable that this region will be found barren of production in view of the large reserves found in fields now on the outer edge of the productive area. The deeper parts of the basin, lying between the Ector County fields and Chalk-Settles, may also prove to be not too deep to contain oil on structure.

Drilling is disclosing a number of northwest-southeast trends along which there are large fields and equally large gaps. More discoveries may be expected along these lines of folding.

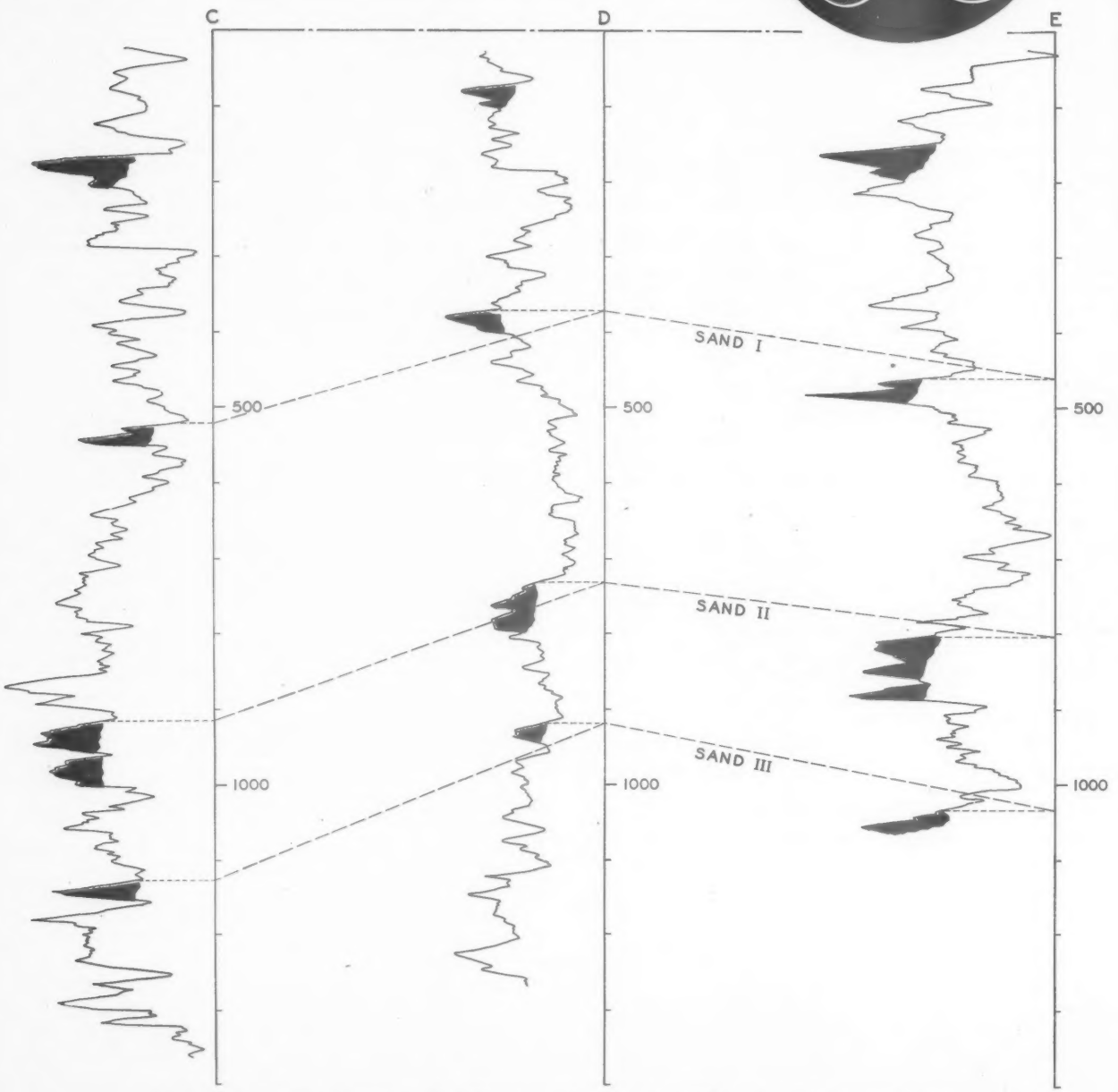
In view of the large production from the prolific lime fields, the Delaware sand has not been prospected to any great extent but production has been found along the margin of the western basin and more may be expected. In fact, this sand provides the best known possibilities for extending production into southern Pecos County and the area to the southwest.

Permian oil may be encountered in southern Oklahoma both to the north and south of the Wichita-Arbuckle mountain belt.

In the Rocky Mountain area, there has been little interest in Embar black-oil production until recently when there was sufficient demand to provide a market for the oil already found. Search for Tensleep and Madison oil will undoubtedly uncover additional Embar production in several of the basins of western Wyoming.

GENERAL GEOLOGICAL CONSIDERATIONS: As the Permian formations represent the last marine deposits in the Mid-Continent area, no production can be expected above this level north of the Appalachian-Ouachita-Mexia-Balcones belt. This does not, of course, include the Rocky Mountain district where the basins did not form until long after the Permian so that conditions which prevailed in the Mid-Continent during the Pennsylvanian are repeated in this area in the Mesozoic.

S S C SPECIALIZES IN THE ACCURATE
REVEALING OF GEOLOGIC STRUCTURE



Gamma Ray Logs of Three Wells in The La Concepcion Field of The Venezuelan Oil Concessions.

Those wells logged through five inch and eight inch casing.

PLASTICS from PETROLEUM

PETROLEUM and natural-gas hydrocarbons are probably the most prolific source of intermediates for the synthesis of plastic resins according to Robert J. Moore, Bakelite Corp., addressing the American Institute of Chemists. He showed in the accompanying chart the sources of a large number of these resins, omitting the cellulose-type plastics. Many of the intermediates shown here as coming from coal are also produced from petroleum or natural gas.

The resins here mentioned are divided into two main classes—thermoplastic resins, which become softened or plasticized at elevated temperatures, and thermosetting resins, which "set" or harden when heated and which generally cannot be softened again with the use of solvents, if at all. The thermoplastic resins are generally polymerization products, produced essentially from petroleum or coal-tar hydrocarbons or both. They include alkyl resins from certain oils and fats, aliphatic and aromatic acid anhydrides; methacrylics, from acetone and acetic acid; the fusible phenolics from aromatic hydroxides—phenols, as carbolic acid—and formaldehyde; polystyrenes, from benzene and ethylene polymerization; polyvinyl and vinylidine resins from vinyl chloride or vinyl acetate or vinyl alcohol, and from vinylidine chloride, respectively. In addition the synthetic rubbers, Perbunan or buna-N, buna-S, butyl vistanex, Koroseal and Thiokol are derived largely from petroleum sources, ethylene gas, butadiene, styrene, etc., and are classed as thermoplastic resins.

The thermosetting resins include the urea and melamine types, from formaldehyde and urea, and from melamine polymerization—via calcium cyanamide—both these and the third type of phenolics being condensation products.

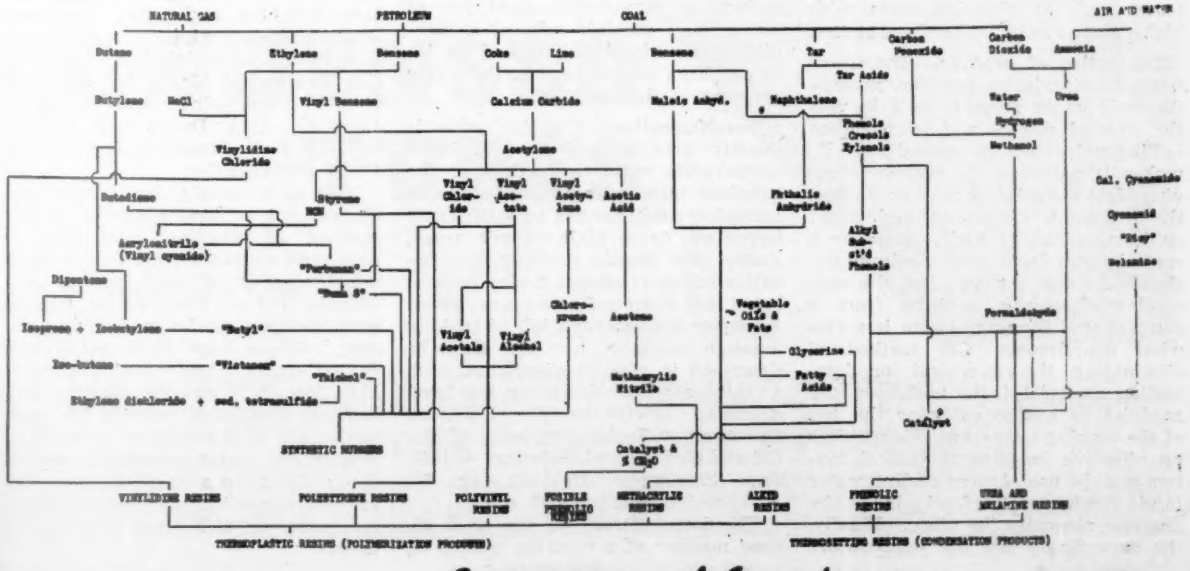
Intermediates

Of the intermediates for all these products, all the important ones, even cyanamide, are producible from petroleum hydrocarbons. Butane, butene, ethylene, isobutene, acrylonitrile (vinyl cyanide) and other vinyl compounds are obtained preferably from petroleum. Benzene, naphthalene and from it phthalic anhydride for alkyd resins, phenols and cresols are normally made as byproducts of coal carbonization; coke may be petroleum coke or coal coke; amounts of benzene, naphthalene over and above the quantities normally available as coal byproducts are made preferably from petroleum. Carbon dioxide, from which urea is made, also carbon monoxide for synthesizing methanol for formaldehyde, are combustion products from any organic fuel material, most easily and cheaply obtained as a byproduct from either coal coking or petroleum coking or combustion of waste fuels. The aromatic hydroxides such as phenol are synthesizable from benzene derived from the catalytic rearrangement of petroleum hydrocarbons if more phenol is needed than is produced as natural byproducts from coal tar.

In all this list that family of products utilizing the greatest number of intermediates is synthetic rubber. These intermediates are butadiene, isobutylene, isoprene, styrene, acrylonitrile, ethylene dichloride, sodium tetrasulfide, chloroprene, the vinyl combinations and various other materials, some not listed here. Methacrylic acid and nitrile are employed in some variations of synthetic rubber and have not assumed appreciable commercial importance for this purpose. Several other products are under study as copolymers or modifiers to determine their effect on rubber properties, but also are not yet of serious importance.

From the petroleum viewpoint these byproducts and the actual and potential outlets which they offer are a series of challenges both technically and economically. Theoretically and, in the majority of cases, actually any one or more of these intermediates is obtainable by its isolation from larger percentage products now being produced in the refinery and natural-gasoline plant. Butadiene is obtained commercially in large tonnage annually from the byproducts of severe thermal cracking of light hydrocarbons, also from medium molecular weight hydrocarbons. Normal and isobutanes and butenes are formed in large amounts incident to thermal and catalytic cracking, requiring only concentration from the other reaction products, a step not always economically practicable under the conditions of the past in refining operations. Similarly benzene and toluene are formed by thermal or catalytic cracking under specified and well-known conditions; from the former, by com-

(Continued on Page 52)



Practical Refining Series—Part 9

Plant Modifications to Make Aviation Gasoline

by W. L. Nelson

THE manufacture of 100-octane gasoline requires such special processes and so much new equipment that refiners normally cannot alter their regular plant equipment for its manufacture. With regard to other grades, such as 73 octane (with 1 cc. TEL) and 91 octane (with 4 cc. TEL) gasoline, as well as less well known grades, such as 87 and 96 octane, relatively simple plant alterations have, in many instances, permitted the manufacture of these grades of gasoline.

Obviously, the gasoline portions of different crude oils do not have the same antiknock properties, and hence the following types of stocks will be encountered:

1. Aviation naphthas—Ones which need only to be separated from the crude oil by topping distillation.

2. High-octane naphthas — Ones which require mercaptan removal (solutizer sweetening) or catalytic desulfurization to improve their octane number and their lead susceptibility.

3. Fair-octane naphthas — Ones which require both desulfurization and removal of normal pentane (substitution by isopentane).

4. Poor-octane naphthas — Ones which need even additional improvement, such as blending them with high-octane stocks from other sources.

Separation of naphtha.—The specifications of aviation gasoline, notably the Reid vapor pressure of 7 lb. and the sum of the 10 and 50 per cent boiling points not to exceed 307° F., makes it necessary to remove some very light material, as well as to limit the end point. Obviously, such a cut or fraction can be easily made by a special rerun fractionating column designed for this purpose, but the separation of such a naphtha from a conventional topping system is somewhat troublesome. One method of eliminating the front-end or low-boiling material is to withdraw the naphtha as a side cut near the top of the topping tower, but this requires an effective instrument control system and the use of more cooling water (and condenser surface) than the amount normally in place. Finally, the exceedingly low top temperature required in such an operation, tends to cause the condensation of water in the tower. This trouble arises even if no steam is used in the tower—water accumulates from even small amounts of b.s. and w. in the crude oil. The water can be eliminated from the tower along with the aviation naphtha side-stream cut, but the fractionation under such conditions is not good.

Gas-Recovery System

If the plant is equipped with a gas-recovery system, or can be so equipped, the aviation naphtha can be taken overhead from the topping tower by operating the gasoline receiver at a temperature of 115°-125° F. Obviously, such a process is wasteful of light hydrocarbons unless the gas from the gasoline receiver is sent to a recovery system. An increasing number of refiners are employing this simple method. A home-made gas-recovery system for this purpose is being used by some refiners. In these, the rich vapor from the hot reflux accumulator is contacted with motor naphtha or gasoline in a small absorption tower. When using a low vapor-pressure naphtha as an absorbent, a remarkably good job of recovery is possible—almost a complete recovery of butane and an increase from one to nine in the vapor pressure of the naphtha.

Desulfurization.—Desulfurization is usually accomplished by the high-temperature catalytic method or the solutizer mercaptan-removal process, but a few naphthas can be sufficiently improved by a plain caustic wash. Except for caustic washing, the desulfurization processes are so complicated that many refiners cannot adopt them for a temporary job of making aviation naphtha, nor can they be described in a short discussion, such as this one. Desulfurization has been discussed briefly on the following Questions on Technology pages of The Oil and Gas Journal, February 4, 1943, page 46; October 22, 1942, page 56; October 10, 1940, page 97, etc.

The improvement in the final octane number of a naphtha with 3 cc. TEL) by desulfurization ranges from about one unit in octane number to as high as four units in octane number. Thus, a naphtha whose octane number can be raised by 18 units by the use of 4 cc. TEL, may be raised by 20 to 22 units after it has been desulfurized.

Pentane removal.—Normal pentane has a relatively low octane number (65.5 blending O.N.) whereas isopentane has a high octane number (99.5 blending). The pentanes are most often considered useful because they can be separated from the gasoline with more ease than most other hydrocarbons. The following tabulation indicates the approximate increase in octane number attained by the removal of pentane and the careful saving of all isopentane, particularly that which (about 5 per cent) is usually lost in refinery gases.

	Octane number	
	Before	After
67-octane stock	67	69.1
70-octane stock	70	72.6

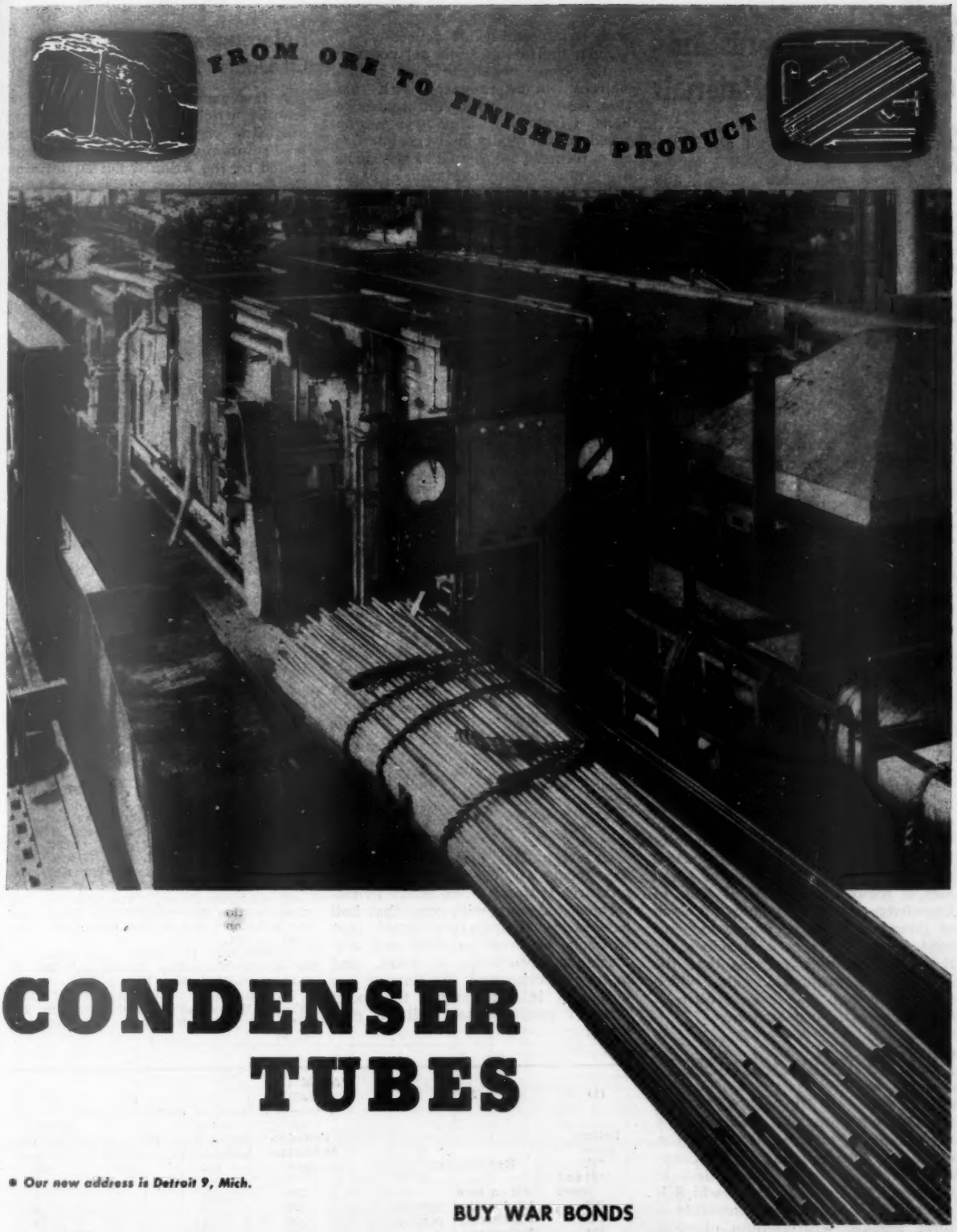
Obviously, little improvement in a base stock whose octane number is 65.5 or lower than the blending octane number of normal pentane (65.5).

The removal of normal pentane is not a simple operation. It involves the use of three fractionating towers—one for the removal of butanes, another for isopentane, and a third for normal pentane. Each of these must be operated at a reflux ratio of 5 to 10 and a pressure of at least 60 lb. per sq. in. abs. must be used for the debutanizer.

Octane Number Analysis Chart

In the Practical Refining article of May 13, 1943, entitled "Evaluating Aviation-Gasoline Content of Crude Oil," a chart-method of plotting octane numbers and vapor pressures was employed which we find was discussed in an article in The Oil and Gas Journal of March 25, 1937, entitled "Correlating and Showing Crude-Oil Assay Data," by S. D. Turner and F. C. Canant of the Humble Oil & Refining Co.

The early article, by Turner and Canant, is a detailed discussion of this method of plotting crude-analysis data, and contains other useful ideas which readers of the Journal may wish to review. The method is probably the most useful method of plotting "mid-per cent" (differential) and "yield" (integral) curves that is available, but it is not suitable for presenting distillation curves. A main advantage of the method is the possibility of superimposing several types of data on a single chart so that several properties can be noted at the same time (or at a single point on the chart).



CONDENSER TUBES

• *Our new address is* **Detroit 9, Mich.**

BUY WAR BONDS

CALUMET AND HECLA CONSOLIDATED COPPER COMPANY

WOLVERINE TUBE DIVISION

Seamless Copper — Brass

1433 CENTRAL AVENUE DETROIT, MICHIGAN

Completion Records Aid Conservation of Materials

(Continued from Page 48)

and cement-invaded area about the bore hole.

The area perforated "from" and "to" would include the measurements from the derrick floor to the top perforation as "from" and the measurement from the same reference point to the bottom perforation as "to."

"Fluid Tamp" reflects the kind, i.e. whether rotary mud, clear water, salt water, oil, etc., and the number of feet of fluid in the hole at the time of perforating. If casing is dry the word "dry" can be written under the heading "kind."

The name of the company that did the perforating should be recorded as reference will often have to be made to the company's records for detailed data.

Work subsequent to completion.—Under this heading should appear only the dates of the various operations that come under the category of work subsequent to completion. These operations break down into shots, drilled deeper, cleaned out, plugged back, acidized and finally abandoned, each being covered by a detailed report.

At times this writer has thought that the term "Economic limit" has been used too recklessly, for certainly it can be readily seen that the economic limit is reached only when the expenses incident to operation exceed the income. Income can be more, in direct proportion to the knowledge and use of what one has to work with. Every venture is started intentionally for a profit, but always at the risk of a loss and many are the times when loss is incurred because of lack of knowledge, which, in short, is lack of records. The war emergency has made everybody record conscious, for it is only through records that the longevity and wear-life of that which has cost money and is very difficult to replace can be determined.

Plastics from Petroleum

(Continued from Page 49)

bination with ethylene producible by the same or a parallel operation, ethyl benzene is made to be dehydrogenated in any quantities to styrene. Ethylene dichloride which is combined with sodium tetrasulfide to form Thiokol with sodium elimination, is one of the simplest materials to produce, by combining molecular chlorine with ethylene gas. It is even very possible, technically, to form sodium tetrasulfide from caustic soda and the sulfur derived from high sulfur-bearing crudes, though probably not at all practicable in comparison with other established processes.

Even the fats and oils derived normally from vegetable and animal sources can be prepared with relative ease from petroleum hydrocarbons. Glycerin is already manufactured commercially in large quantity as a refinery byproduct. Fatty acids are synthesized by oxidation of paraffin hydrocarbons, technically quite feasible, economically probably not practicable to obtain at present in sufficient purity by this method.

From these data it is obvious that petroleum and natural-gas hydrocarbons are the most advantageous general source of these plastic intermediates considered over-all. No other source offers so many of them in such simple and easy-to-obtain manner in such quantities. Coal tar is not nearly so promising a source of the light hydrocarbons of one to five or six carbon atoms, especially the olefins and diolefins. Thus from many scrap materials, special products will be evolved from them to return added profits to the refiner.

Questions on Technology

(Continued from Page 31)

the hydrocarbons are present in equal amounts in the feed stock, in which event, the analysis of the toluene cut would be:

	Per cent
2,3-dimethyl pentane	0.32
Isoheptane	0.65
3-methyl hexane	0.97
1,3-dimethyl pentane	0.97
3-ethyl pentane	31.48
Heptane	32.49
Ethyl cyclopentane	28.25
2,2-dimethyl hexane	4.87
2,5-dimethyl hexane	0.00
	100.00

Unfortunately, our knowledge of the formation of constant boiling mixtures between these many hydrocarbons (or even with ones that boil outside this temperature range), particularly between paraffin and aromatic hydrocarbons, is scant, and hence, experimental distillations are necessary in determining the exact type of product that will be produced.

References on Recovery Of Doctor Solution

A few years ago there appeared a lengthy article in your or some other magazine on the reclaiming of the lead solution used in refineries as perfected by the Atlantic Oil & Refining Co. Can you please advise what issue contained this article?—R. B. E.

It is not the province of this department to locate specific articles by a library search unless the article is recognized and is readily at hand. Many articles on this subject have appeared and if it be necessary to have the specific one that you mention, you should write directly to the company.

The recovery of spent doctor solution is most often accomplished by heating the slurry to 150°-175° F. and blowing air through it. This converts the sulfide into plumbite by an oxidation reaction. Among the many references to this operation are the following (note No. 3, which describes the Atlantic Refining Co. operation):

1. Gerstenberger, D. F., Petroleum Engineer, Jan. 1930, p. 167.
2. Gerstenberger, D. F., Chem. & Met. Eng., Vol. 38, p. 76 (1931).
3. Ziegenhain, W. T., "Recover 17,000 lb. Litharge Daily," The Oil and Gas Journal, Sept. 18, 1930, p. 46.
4. Goode, R. E., "Recovering Litharge From Sludge," The Oil and Gas Journal, Oct. 24, 1929, p. 46.
5. Valentine and MacLean, "Recovery of Byproducts From the Dctor Cycle," Ref. & Nat. Gaso. Mfr., Oct. 1935, p. 475.
6. Valentine and MacLean, "Reduces Time of Regenerating Doctor Solution," Ref. & Nat. Gaso. Mfr., Apr. 1940, p. 123.
7. Wilson, V. W., "Effect of Hydrogen Peroxide in Regeneration of Spent Doctor Solutions," Ref. & Nat. Gaso. Mfr., Mar. 1939, p. 96.
8. Berger, C. W., "Naphtha and Lead Recovery System Proves Economical," The Oil and Gas Journal, Mar. 11, 1937, p. 81.
9. Albright, J. C., "Recovers Doctor in 2 Hours at Michigan Refinery," Nat. Pet. News, Sept. 16, 1936, p. 24-H.
10. Albright, J. C., "Fractionation and Condensation Recover Distillate From Doctor Solution," Ref. & Nat. Gaso. Mfr., May 1941, p. 157.
11. Bottomly, H., "Centrifugal Separation of Doctor-Blackstrap Emulsions," Ref. & Nat. Gaso. Mfr., Mar. 1941, p. 74.
12. Fielschmidt and Cantrell, "Doctor Sludge Recovered With Chlorine in F-C Process," Ref. & Nat. Gaso. Mfr., Feb. 1930, p. 97.

TABLE 1

(1)	(2)	(3)	(4)	(5)	(6)
		Per cent of each hydrocarbon			
Boiling point °F.	Hydrocarbon	Found in isoheptane cut	In the residue from isoheptane cut	Found in heptane cut	In the residue from heptane cut
187 and lower	All in feed	100	0	0	0
187	3,3-dimethyl pentane	100	0	0	0
193	2,3-dimethyl pentane	99	1	1	0
194	Isoheptane	98	2	2	0
195	3-methyl hexane and 1,3-dimethyl pentane	97	3	3	0
204	3-ethyl pentane	3	97	97	0
209	Heptane	0	100	100	0
217	Ethyl cyclopentane	0	100	87	13
222	2,2-dimethyl hexane	0	100	15	85
229	2,5-dimethyl hexane	0	100	0	100
230	Toluene and 2,4-dimethyl hexane	0	100	0	100

CONTROL OF PUMP REPAIR COSTS

IN problems involving excessive pump repair cost it is frequently necessary to chart all available operating data. This permits the complete analysis required for determining the remedial action most likely to result in lower repair cost.

Due to space limitation, the operating data on a high pump repair cost well in Seminole (Fig. 1) is shown for a period of only 5 months. At the time of the investigation a chart was made up covering a period of 14 months and 3 days. Fig. 2 has been briefed from the original chart to facilitate discussion. This chart contains the same data as shown in Fig. 1, except the graphic representation of pump life. Such charts should also show reconditioning work, which can be noted by an arrow on the completion date.

Causes of Failure

A brief survey of the information contained on the data sheet furnished to the pump engineer when excessive pump trouble develops will indicate the cause. In this case sand was responsible for the short pump runs, although evidence of corrosion showed up occasionally. When sand is involved as a primary cause of pump failure each of the following remedial possibilities must be considered:

1. Permitting well to stand after servicing.
2. Cleaning out.
3. Use of sand trap.
4. Use of special sand pump.
5. Reduction of tubing movement.
6. Use of filter.
7. Change in operating cycle.

In this particular case an analysis of data eliminated all remedial possibilities except "reduction of tubing movement." In Fig. 2 it will be noted that the downward trend of production was arrested when the standing valve was placed to within 10 ft. of bottom — and that at this time the cost of pump repairs increased. Since the cycle could not be changed, due to engine limitations, and because a loss in production would obviously result if the pump was raised; anchoring the tubing to prevent movement appeared to be the only possibility for reducing the pump repair expense. This procedure has been followed in a number of cases, and while not always successful in reducing pump trouble, it is considered reliable enough to justify a trial in cases where the operating data indicate possible success.

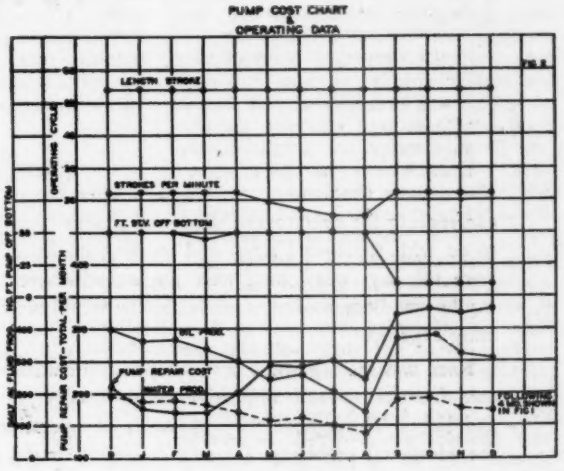


Fig. 2

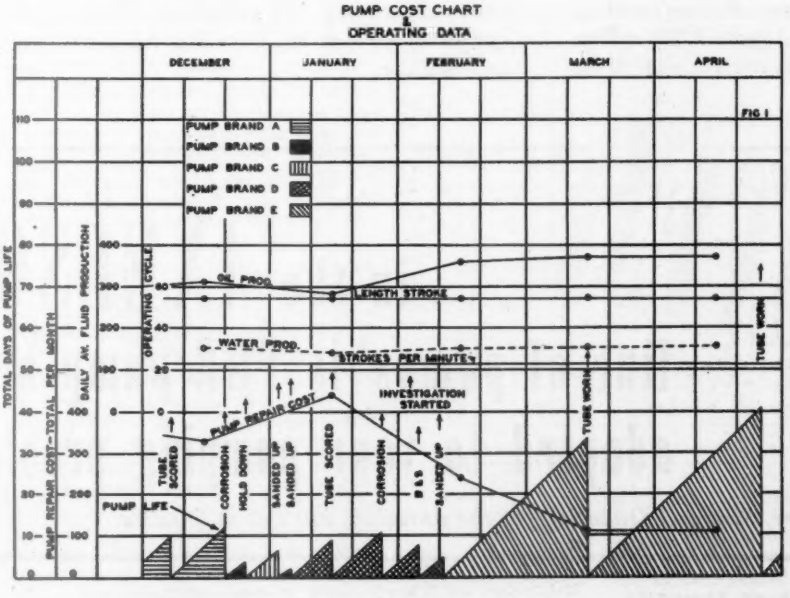


Fig. 1

A tubing catcher was therefore installed in the string, approximately 600 ft. above the lower end of the string, and a portion of the tubing weight was set on the catcher. Longer pump runs resulted, and it appears that a reduction of the churning motion of the tubing in the bottom of the hole was sufficient to eliminate a large amount of the agitation which apparently kept the sand and fluid thoroughly mixed. While a new pump was installed at the time the tubing catcher was run, it was the same type previously used. All parts were made of noncorrosive material, however, to insure that pump operation would not be interrupted on account of corrosion.

In problems of this kind pay out must receive careful consideration. The methods of calculation was discussed briefly in a cost engineering article entitled "The Economics of Cleaning Out," which appeared in the May 13 issue of The Oil and Gas Journal.

PROBLEMS

OF EFFICIENT PUMPING OPERATIONS

1943 VERSION

There was a time and not so long ago when the problems confronting the operators of deep well plunger pumps had to do with types—and sizes—and wearing qualities. Those were the days when men were buying whichever pump would give them maximum production with minimum operating expense.

Keen was the argument between pump users and pump manufacturers as to the respective merits of valves, plungers and liners. Throughout the arguments of operations ran the additional problems of pump diameters, pump liners, plunger strokes and speed of pumping.

Alas we didn't appreciate fully those good old days when if you didn't like one material or one manufacturer's methods or one type or size, you just ordered another. Try and get away with it today and see what happens. Yet, with all the troubles that pertain to material scarcity, manpower shortage, and transportation complications, Axelson by comparison is still in the best position to help you solve your pumping problem. We probably can't give you the exact pump you'd like to have, possibly what we will have to offer will be vastly different with what you'd had in mind, but you can rest assured that into it will be built the quality of materials and workmanship upon which Axelson has prided itself for over half a century.

We can't advertise specific pumps today because we're never sure that they'll be available when you want them. One thing we can tell the trade with all sincerity is that if and when you need new deep well plunger pumps, you'll stand a better chance of getting them from Axelson than possibly anywhere else.

ANSWER . . . in the AXELSON

line of pumps* is THE pump best adapted to your pumping problem

Materially restricted in Type, Size and Quantity for the duration, but not in Quality.

AXELSON MANUFACTURING COMPANY
Post Office Box 98, Vernon Station, Los Angeles, California
50 Church Street, New York City
St. Louis, Missouri • Tulsa, Oklahoma

Mid-Continent and Eastern Distributor: FRICK-REID SUPPLY CORPORATION
Rocky Mountain Distributor: GREAT NORTHERN TOOL COMPANY
Foreign Distributors: AXELSON MANUFACTURING COMPANY
Avda, Pte., R. Saenz Pena 832, Buenos Aires, Argentina
INDUSTRIAL AGENCIES, LTD., 7 High St., San Fernando, Trinidad, British West Indies
C. C. MEDERMOND, Apartado 331, Maracaibo, Venez.

Engineering Fundamentals No. 94

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

APPLICATION OF SUBSURFACE PRESSURE DATA IN GAS-LIFT WORK

IN producing an oil well by means of gas lift, there are several uses to which subsurface-pressure data may be applied in order to determine the most efficient manner to equip and operate the well.

One of the most important of these applications is in determining the proper tubing depth for each well. If the tubing string used is too short it may result in the holding of excessive back pressure against the face of the producing interval with consequent reduction in the volume of oil produced from the well. If the tubing string is too long, it may mean that no appreciable increase in production is being obtained, due to certain well conditions, over and above that which could be obtained with a shorter string of tubing in the well. At the same time, the longer string of tubing represents additional investment; and requires a higher input pressure for the gas at the well head due to greater friction losses through the longer string, which means higher compression costs in supplying the input gas. The additional length of tubing and higher compression costs can be justified only if they are offset by additional production from the well.

A flowing-pressure gradient, taken on a gas-lift well which has the bottom of the tubing considerably above the bottom of the hole, will give valuable information to use as a basis for judging whether it would be advisable to lower the tubing in the well. If the flowing gradient shows a relatively heavy column below the tubing as compared to the gasified column within the tubing, there is a good indication that lengthening of the tubing string will reduce the back pressure held against the sand face by gasifying the oil column in the lower portion of the well bore, and thus result in an increased rate of oil production. An exception to this outcome would occur in a well with such a low productivity index that the lower back pressure on the sand face would result in only a negligible increase in the rate at which oil could be produced from the well.

At least, an experienced production engineer should be able to judge whether it would be advantageous to lower the tubing in a well, which is now producing by gas lift with the tubing off bottom; provided he has a flowing-pressure gradient taken with the well producing with its present tubing installation, and also has data relative to the productivity index or effective permeability of the producing formation.

Example*

Curve A of Fig. 1 represents a flowing-pressure gradient taken on a gas-lift well with the bottom of the producing tubing string at 6,000 ft. It can be seen from examination of the curve that the surface producing pressure was 170 lb./in.² and that the increase in pressure per unit of depth down to the bottom of the tubing (6,000 ft.) was rather low as compared to the increase in pressure per unit of depth between the bottom of the tubing and the bottom of the well (8,200 ft.). Because of this marked change in the pressure gradient below the bottom of the tubing, and because of the fact that the well had a sufficiently high productivity index to justify such an opinion, it was believed that lowering of the tubing to a point near the bottom of the well would lighten the column of oil between 6,000 ft. and 8,200 ft., thus lowering the back pressure on the producing sand and result in increased production.

Accordingly the tubing was lowered to a point near bottom and a flowing-pressure gradient, shown as Curve B in Fig. 1 was taken while the well was flowing with the same surface producing pressure as on the first test. It will be noted that the pressure against the producing sand at the bottom of the well was reduced, due to the lengthening of the tubing string, from 1,000 lb./in.² to 660 lb./in.² As a result the well produced 918 bbl. of oil and 11 bbl. of water on the second test as compared to 535 bbl. of oil and 13 bbl. of water on the first test.

*Note: The data used in this example are taken principally from information reported by E. W. McAllister in "Development and Application of Subsurface-Pressure Data in Kettleman Hills," a paper presented before the Los Angeles meeting of the A.I.M.E. in October 1940 and published in Petroleum Development and Technology, 1941. However, some of the data were read from curves and are not meant to be an exact reproduction of Mr. McAllister's data, but rather an illustration of a use of subsurface-pressure data.

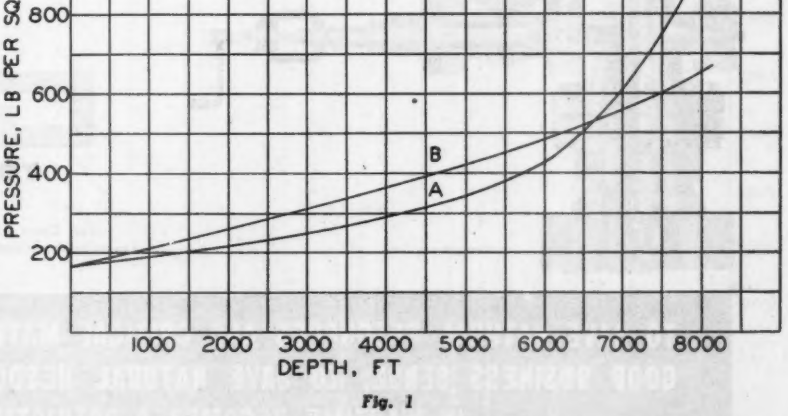
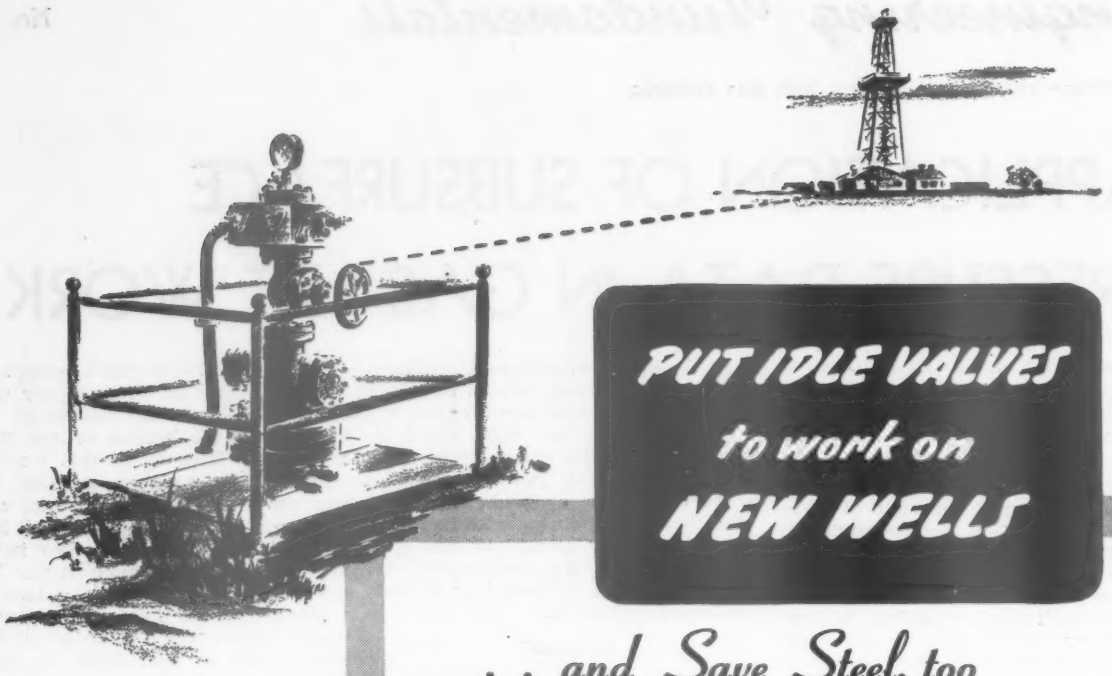


Fig. 1

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

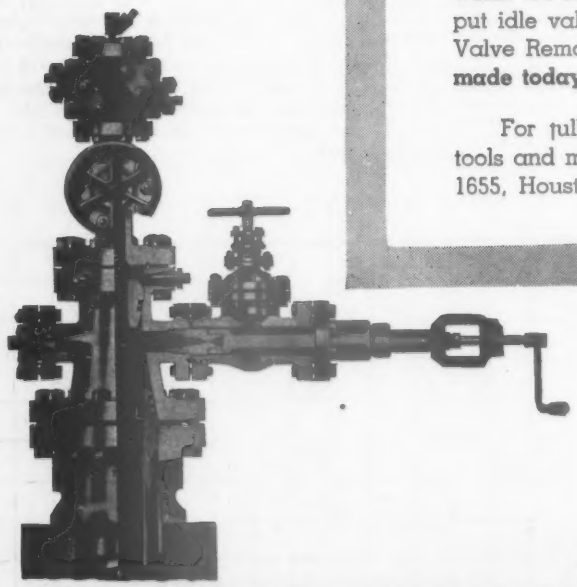


PUT IDLE VALVES to work on NEW WELLS

. . . and Save Steel, too

The Gray method of valve installation, valve removal and reinstallation provides for valves to be used on an indeterminable number of succeeding completions. Idle valves, left to rust away on the only well on which they were installed, not only run up investment, but waste precious steel. Perhaps you have valves on your Christmas Trees that are idle, that could be put to work on new wells. It's not only good business sense but your duty to put idle valves to work wherever you can. Let the Gray Valve Removal Tool help you. **A valve saved is a valve made today.**

For full details of this and other Gray steel-saving tools and methods, write Gray Tool Company, P. O. Box 1655, Houston, Texas.



GRAY
TOOL COMPANY
HOUSTON, TEXAS

West Coast Distributor: WAGNER-MOREHOUSE, INC., Los Angeles
Export Representative: GUY E. DANIELS, 30 Rockefeller Plaza, New York City

TO SAVE NATURAL RESOURCES AND CRITICAL MATERIALS IN PEACETIME MAKES GOOD BUSINESS SENSE; TO SAVE NATURAL RESOURCES AND VITAL MATERIALS IN WARTIME BECOMES A PATRIOTIC OBLIGATION.

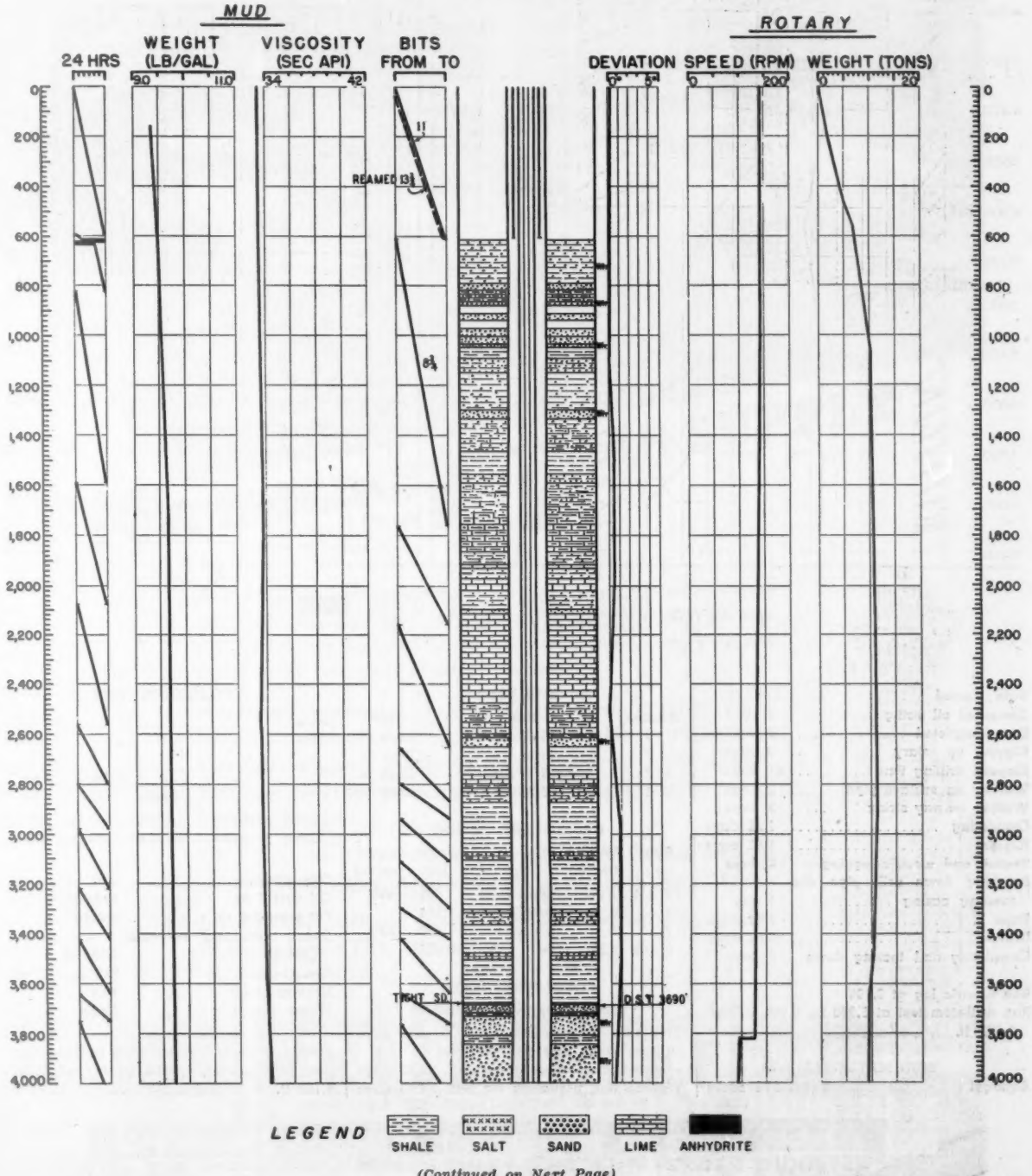
CONTINENTAL OIL CO. A-1 JACK HILDRETH CO.

E.T.R.R. Survey, Montague County, Texas
Elevation 1,035 ft. (Derrick Floor)

CONTRACTOR

**NOBLE DRILLING CORP.
TULSA**

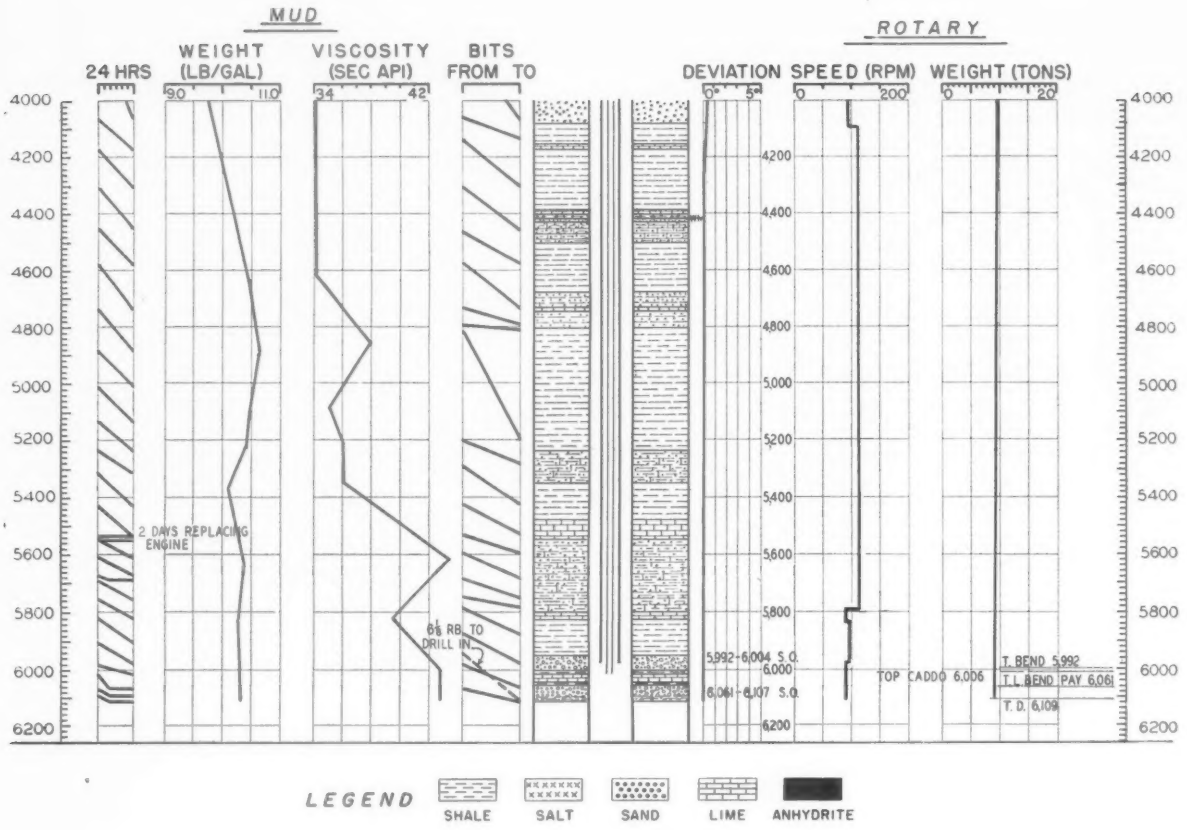
Discovery Well, Bend Production, Hildreth Pool



(Continued on Next Page)

Journalog

Discovery Well, Bend Production, Hildreth Pool (Continued)



Date started	12-22-42
Cemented oil string	2- 1-43
Date completed	2- 5-43
Rigging up rotary	3 days
Elapsed drilling time	41 days
Waiting on surface pipe	2 days
Waiting on pay string	3 days
Circulating	1.25 days
Repairs	5.50 days
Testing and electric logging	2 days
Breaking down drill pipe and running casing	1 day
Trips	8.30 days
Drilling	22.50 days
Completing and tearing down	8 days

Ran electric log at 6,109 ft.
Ran drill-stem test at 5,990 ft., 6,066 ft. and 3,690 ft.

MUD MATERIALS

Aquagel	274 sacks

BITS USED

Number	Size	Type
1	13 3/4-in.	Rock bi
1	11-in.	Rock b
32	8 3/4-in.	Rock bi
1	6 1/8-in.	Rock bi

CASING AND TUBING

Size (in.)	Weight (lb./ft.)	Type	Depth (ft)	Cement (sacks)
10 3/4	3 ga.	Spiral weld	600	400
7	28	Seamless	1,140	
7	26	Seamless	4,858	550
2 1/2	6.50	H-40	6,017	

COMPLETION DATA

Method—Reverse circulation

Preparing to complete	1.60 days
Drilling plug and reverse and normal circulation to wash	2.00 days
Waiting and preparing for test	4.00 days

PRODUCTION TEST

Date	2-8-43
Time	6 hours

	Static	1st 3 hr.	2nd 3 hr.
Casing pressure	1,100 lb.	850 lb.	850 lb.
Tubing pressure	1,100 lb.	400 lb.	400 lb.

Size choke	1-in.
Oil first 3 hr.	570.20
Oil second 3 hr.	563.40
24-hr. calculated potential (563.04 × 8)	4,504.32
Gas-oil ratio	783 cu. ft./bbl.
Gravity of oil	40.6°
Water	None

Producing zone: Conglomerate in Bend lime. Two pay streaks, 5,992-6,004 ft. and 6,061-6,107 ft.

FOR EMERGENCY GAS SUPPLY

A PRITCHARD designed *Stand-By* fuel system will eliminate the costly results of a forced shutdown due to failure of regular gas supply. Fuel can be delivered by rail tank car or truck at any time, and stored for an emergency or critical demand.

Propane-air possesses same heating qualities as natural gas and can be substituted in the industrial system without burner adjustments. Complete or partial changeover can be made in a few minutes. Butane, or propane-butane, liquified petroleum gas mixtures may be used interchangeably.

J. F. Pritchard and Company design, engineer and construct complete *Stand-By* fuel plants to specifications, covering all types of fuel.

J. F. PRITCHARD and Company, *Natural Gas Division,* Fidelity Building, Kansas City, Missouri.

KANSAS CITY
TULSA
CHICAGO

Pritchard

HOUSTON
NEW YORK
PITTSBURGH

ENGINEERS AND CONSTRUCTORS
FOR THE CHEMICAL • PETROLEUM • GAS AND POWER INDUSTRIES
Manufacturers of Mechanical and Atmospheric Cooling Towers

Natural Gas

Gas Consumption Rises 11.5 Per Cent, A.G.A. Reports

NEW YORK.—Sales of natural gas by utility companies reporting to the American Gas Association increased 11.5 per cent to a grand total of 195,113,100,000 cu. ft. in February compared to a year ago.

Industrial sales rose 12.5 per cent, domestic consumption was up 8.8 per cent, commercial demand increased 4.8 per cent and gas used in generation of electricity advanced 25.4 per cent.

Combined consumption for industrial purposes and for electric generation aggregated 102,350,100,000 cu. ft., constituting more than 52 per cent of the monthly total.

East Ohio Gas Co. Line to Be Completed October 1

CLEVELAND, Ohio.—Despite a delay of nearly 30 days caused by heavy rains, construction engineers on the 120-mile 20-in. natural-gas line from Brecksville to Maumee, Ohio, anticipate that the project will be completed by the scheduled date of October 1. It is being built by Ford, Bacon & Davis, Inc., New York, and Holland Construction Co., Tulsa.

The line will connect the East Ohio Gas Co.'s Brush Farm station with the Panhandle Eastern Pipe Line Co.'s 1,200-mile Amarillo-to-Detroit system. The linking line is scheduled to deliver from 50,000,000 to 100,000,000 cu. ft. of gas daily during the heavy consuming season.

Shortages of natural gas in the industrial section served by East Ohio Gas Co.'s system were of the order of 26,000,000 cu. ft. on days of maximum consumption last winter. By next winter, East Ohio expects that the yield from Ohio wells which has been between 51,000,000 and 54,000,000 cu. ft. per day will drop to around 35,000,000 cu. ft., with a continued decline to around 32,000,000 cu. ft. in the following winter.

Hope Natural Gas Co. which delivers West Virginia gas to the East Ohio system at the border of the two states will be unable to supply more than 190,000,000 cu. ft. daily next winter compared to more than 200,000,000 cu. ft. in similar recent periods. By the winter of 1944-45, the Hope deliveries to East Ohio are projected at 160,000,000 cu. ft. daily. East Ohio is spending a total of $9,500,000 to augment the gas supply in northeastern Ohio. Besides the $3,500,000 the company is spending for the new 120-mile 20-in. connecting line to the Panhandle Eastern system, nearly $1,000,000 is being invested in compressor stations, $2,000,000 on the liquefaction plant in Cleveland and about $3,000,000 on underground storage.

Capacity of the liquefaction plant in Cleveland, the first in the world to liquefy gas for commercial use, has been doubled. Originally, the plant could store 1,800,000 gal. of liquefied natural gas which in 50 hours could be converted into 180,000,000 cu. ft. of gas for domestic and industrial consumption. The plant's capacity now has been expanded to the liquid equivalent of 300,000,000 cu. ft. The gas is compressed to liquid stage at temperatures of 250° F. below zero.

Gas Chemists' Handbook Revised for War Utility

A new handbook designed to assist gas chemists and engineers in meeting government standards, conserve materials, reduce costs, simplify work and speed up procurement of men and materials has been completed under the sponsorship of the American Gas Association. The A.G.A. committee on revision of the Gas Chemists' Handbook is headed by E. L. Sweeney of Boston, Mass.

The section called "Gas Chemists' Book of Standards for Light Oil and Light Oil Products," written by V. J. Altieri, Eastern Gas and Fuel Associates, has been completed. It constitutes a complete handbook in itself, according to Frank H. Dotterweich, head of the engineering division, Texas A. & I. College, Kingsville, Tex., who has had opportunity to review the work.

Natural Gasoline

Slight Increase Shown In Panhandle Production

AMARILLO, Tex.—Production of natural gasoline, propane and butane in the Texas Panhandle district during May averaged 28,944 bbl. daily according to the current report of the Texas Railroad Commission.

Natural gasoline production averaged 25,019 bbl. daily while combined output of butane and propane averaged 3,925 bbl. daily. Plants handled an average of 1,454,915,000 cu. ft. daily, including 17,513,000 cu. ft. of refinery vapors in Phillips Petroleum Co.'s Borger system, which includes plants at Pantex, Carson, Johnson, Canadian, Sanford and Rock Creek.

April production of natural gasoline, butane and propane in the Panhandle averaged 28,905 bbl. daily. Natural gasoline made up 25,623 bbl. of the April average output while 3,282 bbl. were butane and propane.

New Plant Authorized in Paloma Distillate Field

LOS ANGELES, Calif.—Operators in the Paloma distillate field, discovered by Western Gulf Oil Co. in a joint test with Texas Co., have received authorization for erection of a gas recycling plant which will cost approximately $2,500,000 and will be in operation early next year provided nothing develops to prevent fabrication and delivery of material and equipment. Initial capacity will be 50,000,000 cu. ft. of wet gas, and Western Gulf, acting for the Paloma Operators Committee, will operate the unit. Companies now in the Paloma unit plan include Western Gulf, Texas Co., and Ohio Oil Co. with approval and consent of Kern County Land Co. and other landowners within the unit. A concerted attempt was made a year or so ago to effect a unit plan for the entire field but this failed and Gulf, Ohio and Texas formed their own unit arrangement.

As the plan is now set up, additional operators can become members of the Paloma Operators Committee but they now must first drill and complete a well before becoming eligible. Originally Gulf, Ohio, Texas and Kern County Land were agreeable to the formation of a unit plan that included all acreage within a generally accepted plan enclosing possibly productive acreage.

★ BETTER SOLDIERS FOR QUICKER VICTORY! ★

YOUR pumps will be better, more reliable soldiers in the effort to produce high octane gas and synthetic rubber to defeat the Axis, if they are equipped with Formica pistons and rings.

For this light, tough, chemically inert material reduces wear and lasts longer. It avoids tear downs and interruption of operation. The lightness of the material and smoothness of the surface saves the metal surfaces against which the piston runs. It will stand hydrogen sulfide and other chemical conditions that quickly cause deterioration in some materials.

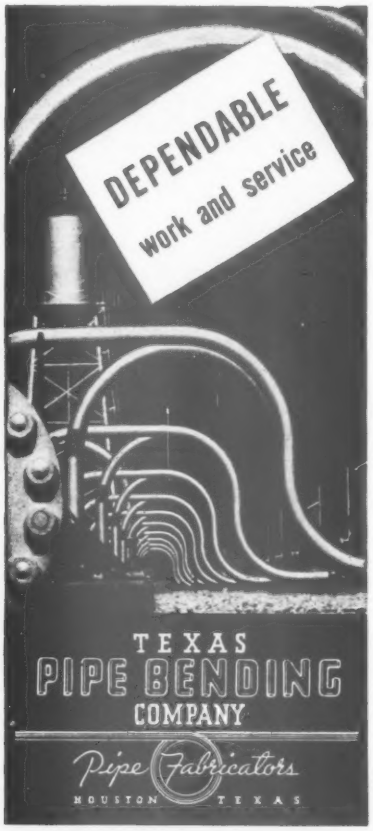
Get all the facts and we are sure that you will give Formica a trial in both producing and distributing equipment.

PLASTELITE ENGINEERING COMPANY
Fort Worth, Texas

THE FORMICA INSULATION COMPANY
1151 Santee Street, Los Angeles, Calif.

THE FORMICA INSULATION COMPANY
4642 Spring Grove Ave., Cincinnati, Ohio

for the oil industry...
RYERSON
Steels
Products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Heavy Structurals, Beams, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc.
JOSEPH T. RYERSON & SON, INC.
CHICAGO • MILWAUKEE • ST. LOUIS • CINCINNATI • DETROIT
CLEVELAND • BUFFALO • BOSTON • PHILADELPHIA • JERSEY CITY



McNAMAR
Steel Plate
Fabricators and Contractors
Products storage
Pressure vessels
McNAMAR
BOILER & TANK CO.
Tulsa, Okla. — Salem, Ill.

REFINING

Rocky Mountain Aviation Plants Are Progressing

DENVER, Colo. — Construction on 100-octane plants by the Sinclair Refining Co. at Sinclair, Wyo.; the Utah Oil Refining Co. at Salt Lake City, Utah; and the Frontier Refining Co. at Cheyenne, Wyo., which was curtailed temporarily by inability to purchase essential materials, is now going forward at a more rapid pace as a result of the allocation of larger quantities of supplies. All three plants are expected to be finished before the end of the year.

The Frontier company expected to have its plant finished September 20 when test runs will begin, but production for the Government will not start until late in October.

Phillips Completes New Alkylation Plant

BARTLESVILLE, Okla. — Production started last week on the ninth plant for the manufacture of 100-octane-gasoline components built and operated by Phillips Petroleum Co. Three of the nine aviation-gasoline plants currently in operation were completed before Pearl Harbor.

The new unit, location of which was not announced, employs the hydrofluoric acid alkylation process and is the second of this type completed by Phillips.

Mexico City Refinery Plans Nearer Fruition

WASHINGTON, D. C. — Detailed plans for construction of an aviation-gasoline refinery at Mexico City moved nearer fruition this week, it was reported by several groups working with the Petroleum Administration for War and representatives of Petroleos Mexicanos, the Mexican government company which will operate the unit.

An increase in the capacity of the Pemex 128-mile 10-in. pipe line from the Poza Rica field to Mexico City is included in the projected program which will cost between $30,000,000 and $40,000,000, it is understood. Pumping stations on the Poza Rica-Mexico City line will be increased from seven to about 10. Added stations will increase capacity of the line about 38,000 bbl. daily.

Capacity of the aviation-gasoline unit has not been determined. Various plans call for capacity ranges of 1,000 to 5,000 bbl. daily. Production from the Mexico City plant would be made available at strategic points throughout the country and would be used largely for fueling American military planes flying to South America and the Panama Canal Zone. The rearrangement of supply possible by the manufacture of aviation fuel near the points of consumption, proponents of the plan assert, would relieve existing transportation facilities.

Canadian Rubber Plant Starts First Production

CHATHAM, Ont. — The Polymer Corp. synthetic-rubber plant at Sarnia, Ont., was expected to start production July 1, and the first batch of buna-S rubber is scheduled to be turned out in November.

When the plant, covering more than 100 acres, is in full operation, it is expected to manufacture more than 40,000 tons of raw synthetic rubber annually. When the plant's production is turned over to peacetime uses it will be more than sufficient for Canada's normal needs, estimated at around 30,000 tons annually.

The Polymer Corp., a government company formed to produce synthetic rubber, a new industry in Canada, will be assisted in the manufacture of the raw product by three other subsidiary concerns which will handle certain phases of the processing. Dow Chemical Co., with headquarters in Midland, Mich., and a new $20,000,000 magnesium plant just starting operations in Marysville, Mich., 6 miles down the River St. Clair from Sarnia, is interested in one process. The St. Clair Processing Co., an affiliate of Standard Oil Co. (New Jersey) is to supervise the oil process; and the Synthetic Rubber Corp. will handle one of the more advanced phases of the processing.

Some 30 contractors and subcontractors are working on the Sarnia construction project with at present more than 5,100 men on the payrolls, and dozens of firms from every province in Canada have supplied execu-

tives and experts. Suppliers fabricating materials for the plant number almost 2,000.

When the completed plant swings into full operation late this fall, it is expected to employ between 1,200 and 1,500 men.

Rubber Director Jeffers recently made an official inspection of the new sulphite-alcohol plant of the Ontario Paper Co. at Thorold, Ont., at which was demonstrated the successful wartime production of alcohol for synthetic rubber and explosives from sulphite liquor, formerly a waste by-product in paper manufacture. The plant was conceived soon after the United States entered the war, and construction began last August. The plant cost more than $500,000 and has a capacity rated at 700,000 gal. of alcohol annually, convertible into butadiene, an ingredient of synthetic rubber. The Ontario development is stated to be the first of its kind in the western hemisphere. Col. Robert R. McCormick, publisher of the Chicago Tribune, which controls the Ontario Paper Co., has announced that the processes discovered will not be patented but will be made available to the industries of both Canada and the United States for the war effort.

Sinclair Starts Longer Week at Houston Refinery

HOUSTON, Tex.—Sinclair Refining Co. went on a 48-hour weekly basis June 26. D. A. Young, operating superintendent, said arrangements for the extended work schedule were agreed upon at a 2-day conference between the refinery management and a committee from the oil workers' union. About 1,600 employes are affected. They will receive time and one-half for the added 8 hours' work.

Shell's Toluene Output Doubled by New Plants

NEW YORK. — Shell's new synthetic process for the production of toluene, the principal ingredient of TNT, has been expedited by the construction of two new plants, with the result that the current rate of production is nearly twice that of last year, according to R. G. A. van der Woude, president of Shell Union Oil Corp.

To aid the national high octane aviation gasoline and synthetic-rubber programs, three new catalytic-cracking units are under construction, two in the Midwest and one on the West Coast, the president said. Also, the company has been granted authorization and priorities to allow still further output of aviation gasoline through erection of two new alkylation plants.

NO. 1 OF A SERIES TO HELP YOU KEEP CRACKING STILLS OPERATING AT PEAK EFFICIENCY

ANNOUNCING A SERIES OF TUBE CLEANING SERVICE HINTS

In this series of ads we will try to analyze and offer solutions to specific problems that may confront you. We will also show you how tube cleaning equipment can be made to be of maximum service to you. Watch for these ads each month hereafter.

In this first ad, we would like to call attention to our service engineers. They are always available to solve unusual problems in refinery maintenance. In many such cases, our engineers have designed special tools to combat a refinery problem, and these tools have later been made available to the entire industry. Call on Airetool for this service at any time.

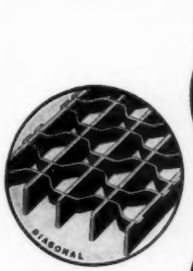
AIRETOOL MANUFACTURING CO.
DEPT. O SPRINGFIELD, OHIO
Manufacturers of Tube Cleaners, Tube Expanders and other Refinery specialties.

POWERFUL BEAM . . or *Bright* FLOODLIGHT WHEN YOU CARRY

ECOLITE 72

This is a safe, efficient economical lantern that gives you a strong 1500 ft. beam or a bright floodlight. It is easy to carry, tilts and pivots, gives you lots of light where needed. Carries Underwriters' Laboratories recommendation for use in Class 1 Group D Hazards. Low price. See it at once. At Oil Well Supply Stores.

ECONOMY ELECTRIC LANTERN CO.
3100 W. CHERRY ST. MILWAUKEE, WIS.



Specify TRI-LOK

OPEN STEEL FLOORING • SAFETY STEPS
CONCRETE ARMORING T. TRI-LOK

DRAVO CORPORATION
300 PENN AVENUE, PITTSBURGH, PA.
REPRESENTATIVES IN PRINCIPAL CITIES

Full descriptive catalog of Tri-lok Grating, Safety Treads and other products on request.

HOBSON-Mc FARLAND SAYS:

"SERVICE KEEPS 'EM ON THE JOB"

Behind every piece of pipe-line and industrial construction equipment stands a complete service organization like Hobson-McFarland, "Caterpillar" dealer in Kansas City, Missouri.

These men know the value of service and of keeping good equipment in tip-top shape. They have keyed their service organization to a wartime pitch and their motto is: "Keep 'em going on the job".

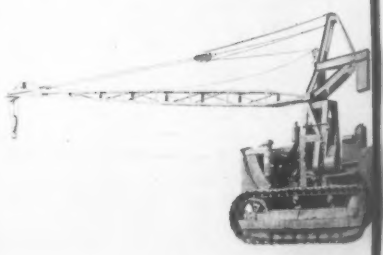
This organization operates in forty-nine counties in northwestern Missouri and eastern Kansas. With complete parts and service facilities in Kansas City, Trenton and St. Joseph, Missouri, their staff of factory-trained mechanics keep "Caterpillar" and allied equipment going on the job.

Hobson-McFarland, like every other "Caterpillar" dealer, is also distributor for "Cardwell" pipe-line and industrial construction equipment. See these dealers today; they'll help you.

1. General offices and service shops at Kansas City, Missouri.
2. Trenton, Missouri, service shop has large parts stock.
3. Complete service and parts facilities at St. Joseph, Missouri, branch.

"Cardwell" sidebooms are available in four sizes.

Ditch backfiller for "Caterpillar" D4 tractor.



"Cardwell" revolving crane on "Caterpillar" D7 tractor.

PIPE LINES

Atlas Line May Deliver Crude to WEP System

SHREVEPORT, La. — Negotiations for purchase of Atlas Oil & Refining Co.'s 8-in. line running from Longview, Tex., to Shreveport were reported under way this week for the purpose of delivering North Louisiana crude to the Texas terminal of the War Emergency Pipelines, Inc., 24-in. system.

Reports were current that Humble Oil & Refining Co., Houston, Tex., may acquire the line which has been out of service for several months. The line was built during the peak of the East Texas field development and supplied crude to refineries in the Shreveport area.

If the negotiations are completed, the arrangement would supplement supplies earmarked for delivery to WEP from the East Texas field or possibly permit the Humble company to retain some of its South Texas lubricating-oil crudes in the Gulf Coast district.

Talco Starts Operation Of Line to Coke Field

Talco Asphalt & Refining Co. has started delivery of Coke field crude to its refinery at Mount Pleasant, Tex. The Coke field, in northern Wood County, Texas, produces a low-gravity crude from the Paluxy.

The new 6-in. line is 35 miles in length and connects with a field gathering system completed earlier by Talco Asphalt & Refining Co. The field, discovered in June 1942, has had no previous pipe-line outlet. The line first had to be approved by the War Production Board.

Swigart Shows Group New Bayou Pipe Line System

HOUSTON, Tex.—T. E. Swigart, president of Shell Pipe Line Corp., Houston, Tex., and H. H. Anderson, vice president, last week headed a party of about 25 oil-company executives who inspected the 262-mile Bayou Pipe Line System between Houston and Baton Rouge, La.

Mr. Anderson is manager of operations for the line, which was built by the six companies represented in the party: Shell, the managing company; Humble Pipe Line Co., Texas Pipe Line Co., Pure Transportation Co., Pan American Pipe Line Co., and Crown Central Pipe Line & Transportation Corp. Leaving Houston Tuesday morning, the oil men were luncheon guests at noon of Gulf States Utility Co. in Beaumont, Tex., spent the first night in Lake Charles, La., and the second in New Orleans.

Wage Brackets Completed For Pipe-Line Companies

DALLAS, Tex.—Wage brackets for oil pipe-line companies, natural-gas and gasoline plants and geophysical companies were adopted today by the Eighth Regional War Labor Board, completing the sets of wage brackets to cover the petroleum industry in Texas, Oklahoma and Louisiana.

Brackets for crude petroleum producers and oil refineries have been previously announced by the board.

As defined by the War Labor Board, a wage bracket is a "range from minimum to maximum of stable, tested rates for a given occupation in a given labor market area."

Floyd McGown, chairman, explained that the minimum of the bracket for each occupation is the rate above which the WLB, except in rare and unusual cases, may not approve wage increases, unless, of course, they are in accordance with the Little Steel formula. This does not mean that employers have to raise their rates up to the minimum of the bracket.

"All rates within the brackets," Mr. McGown said, "are to be regarded as stabilized, not subject to change, except under the Little Steel formula."

The Eighth Regional WLB brackets were based on recommendations made by the divisions of the board which have been gathering data from the oil industry and from statistical information furnished by the Bureau of Labor Statistics.

Panhandle Eastern Seeks Funds for Expansion

PHILADELPHIA, Pa.—The Panhandle Eastern Pipe Line Co. has filed a registration statement with the Securities and Exchange Commission

WHEATLEY
FOR COMPLETE
PIPELINE SUPPLIES

PUMPS
VALVES
EQUALIZERS
HALF SOLES
COLLAR WRAPS
STRAINERS
TRIPODS
TAPPING MACHINES
STERLING
CENTRIFUGAL PUMPS

WHEATLEY PUMPS and VALVES
TULSA OKLAHOMA

Dependably
Protected
with REILLY
PIPE ENAMEL

Reilly COAL TAR PRODUCTS

17
PLANTS
to Serve the
NATION

REILLY TAR & CHEMICAL CORP.
Executive Offices:
Merchants Bank Building, Indianapolis, Indiana
2513 S. Damen Avenue, Chicago, Illinois
500 Fifth Avenue, New York, N.Y.
St. Louis Park, Minneapolis, Minn.

CRC

PIPE LINE
CONSTRUCTION
EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

McCORD
Mechanical
LUBRICATORS

FOR SLUSH PUMP and
DRILLING ENGINES
TYPE "SP"

Built to take it—to stand up under the extreme conditions of oil field service. You can depend on McCord "SP" lubricators to deliver oil in measured quantities without interruption. Specify McCord "SP".

For Sale by National Supply Company

Standard of the Oil Fields

McCORD
RADIATOR & MFG. CO.
DETROIT, MICHIGAN

here covering a new issue of $10,000,000, 10-year, 2¾ per cent debentures due June 15, 1953.

Proceeds of the sale will be used by the company in carrying out an expansion program, providing for the looping and extension of the concern's transmission system from the Texas Panhandle to the Detroit, Mich., area.

The registration statement makes specific mention of additional compressor capacity and the construction of additional pipe-line facilities for serving the Middle West.

New Record Set in Crude Cleared at Norris City

NORRIS CITY, Ill.—A new peak in petroleum cleared through the Norris City terminal of the War Emergency Pipelines, Inc., 24-in. system was established June 19. During a 24-hour period, the WEP terminal loaded 1,050 tank cars, totaling 232,000 bbl. dispatched east by rail and 88,000 bbl. of crude were delivered to connecting pipe lines for northern and eastern movement.

The first West Texas crude from Longview, Tex., 500,000 bbl., started arriving at Norris City June 22.

WEP officials accompanied by several other oil men inspected work on the eastern end of the 24-in. line June 18. They included W. Alton Jones, president; Burt Hull, vice president and general manager; Alexander Fraser, director; D. F. Leary, secretary; Oscar Burden, general superintendent, and George Brigance, district superintendent, all of WEP. Others included W. F. Abrams, Standard Oil Co. of New Jersey; J. R. Parten and J. Howard Marshall, PAW; George Hill, Jr., vice president of Defense Supplies Corp., and C. H. Hathaway, Gulf Oil Corp., who was host to the group at breakfast in the Duquesne Club, Pittsburgh, Pa.

Two Additional Lines From West Texas Recommended

DALLAS, Tex.—Two additional pipe-line outlets for the West Texas Permian basin, one terminating at Minneapolis or Chicago and the other at the California coast line were proposed here last week by Beauford H. Jester, chairman of the Texas Railroad Commission. The proposal was made before the House subcommittee on petroleum of the naval affairs committee.

The lines suggested by Mr. Jester are in addition to the 16-in. system which Stanolind Pipe Line Co. will start in October from the Slaughter field to Drumright, Okla.

The new lines, Mr. Jester said, would render their greatest service if they were under control of independent oil operators rather than under major company jurisdiction.

"The West Texas crudes," Mr. Jester told the House subcommittee, "are sour crudes. Their sulfur content makes necessary a special type of refinery equipment to remove the sulfur. These crudes will make high-octane gasoline. They should be used more than they are being used in the war use of crude oil. This committee can do much to encourage the use of West Texas crudes by recommending their use to the Petroleum Administration for War, recommending the additional pipe-line outlets and refinery utilization of sour crude."

Pan American Employes Placed on 48-Hour Basis

HOUSTON, Tex.—Pan American Pipe Line Co. last week announced that beginning June 28, field employes would work on a basis of 48 hours weekly instead of 40.

On the same date the Houston office of Pan American Production Co., Pan American Pipe Line Co., and Pan American Gas Co. started working on a 44-hour-week basis, the additional hours being from 8 a.m. to 12 noon on Saturday.

Field supervisors of the production company were to go on a 48-hour basis instead of 40 hours. Other employes in the field operations of the production company were to continue on a 56-hour schedule.

Pipe-Line Traffic Rises 10 Per Cent Over 1942 Rate

WASHINGTON, D. C.—Crude oil and products handled by interstate pipe-line companies increased to 419,343,080 bbl., during the first quarter of 1943, it was shown last week by a report from the Interstate Commerce Commission. The first quarter total of oil originating on lines and received from connections compares with 381,210,516 bbl. for the same 3 months in 1942, an increase this year of approximately 10 per cent.

Transportation revenue, accounts 501 and 551 in the ICC report, for the 43 reporting pipe-line companies, increased 9.2 per cent to a total of $58,024,558 during the first 3 months this year.

The highest percentage increase in traffic was shown for Plantation Pipe Line Co. which handled 6,891,221 bbl., in the first quarter this year compared with 2,622,179 bbl. a year ago. The next highest increase was reported by Portland Pipe Line Co., which extends from Portland, Me., to Montreal, Canada. The Canadian feeder line handled 2,946,910 bbl. of petroleum during the first quarter this year against 1,793,056 bbl. in 3 months of 1942.

Exploration and Drilling

Week's Highlights

THE importance of the large extension to the Fort Norman fields (p. 70) may easily be overemphasized by those familiar with American oil fields and American marketing conditions. Naturally, a field which is capable of supplying oil for war purposes in Alaska and the Canadian Northwest is of enormous strategic importance at the present time. As an influence on world conditions from the standpoint of a large addition to known supplies, however, it may be of very minor importance.

The question naturally arises in the minds of many oil producers why the development did not take place earlier. The first drilling at Fort Norman took place immediately following World War I and oil was found. It has been produced ever since but it has served only to supply the demands of a few mines, river boats and airplanes operating in the area. It is too far from settled districts even to enter the northern Alberta market. It was not developed because it was not needed. Transportation costs for all commodities into the area are reflected by prices several times the prevailing prices in cities supplied by railroads, and it is possible that Fort Norman oil could not enter the larger Canadian markets at less than $3 to $4 a barrel.

The local demand for oil may increase, thus requiring more development in the area but, had it not been for the war, drilling would have proceeded very slowly. The field is now being compared with Turner Valley, Canada's largest field to date. That is, it may have a peak production of somewhere around 25,000 to 30,000 bbl. daily.

Were this the only interest that the Fort Norman field held it might be dismissed with little more than a feeling of thankfulness that it has been made available for military use at this time. However, the implications are far more important than this. In northern Canada a series of great lakes from Coronation Gulf on the Arctic to Lake Winnipeg in Manitoba mark the boundary between pre-Cambrian and Paleozoic rocks. These rocks are limestones of three ages, Ordovician, Silurian and Devonian. They underlie the Mackenzie River basin, the prairie provinces of Canada and the Great Plains of the United States. The Ordovician limestones are of Trenton or Viola age, approximately, the Silurian rocks are of Niagaran age and the Devonian rocks are of Onondagan age. Translated into Mid-Continent terms, the Silurian and Devonian rocks are of Hunton age. The Devonian may also be correlated with the Jefferson limestone of Montana which has shown oil.

The finding of large deposits of oil in the Devonian at Fort Norman will encourage deeper prospecting to the Silurian and Ordovician limestones, if it has not already done so. Oil shows are reported in these formations in Manitoba. Shows have been found in the Devonian of Montana and the three limestones produce in the Mid-Continent. They also produce much oil east of the Mississippi River. It may be that Fort Norman is the pool opener in the largest untested petroleum province remaining in North America, one which extends from the Central Kansas uplift into the islands of the Arctic a distance of some 3,000 miles. Fort Norman, lying near the Arctic Circle is not far north of the middle of this enormous basin.

WEST TEXAS: Gas has been found in a deep well on the south flank of the granite high running through Pecos County. The pay is thought to be Pennsylvanian (p. 78).

WYOMING: The Tensleep pay is assuming major proportions at Elk Basin (p. 82).

COMPLETIONS IN ALL FIELDS . . .

(Week ended June 26, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penn., W. Va.	53	20	1	74	150,765	1,570	1,695
Ohio	0	4	5	9	25,146	388	477
Indiana	1	0	3	4	8,347	116	155
Kentucky	3	9	3	15	39,387	167	105
Illinois	14	0	14	28	68,517	796	766
Michigan	6	0	9	15	36,990	231	328
Kansas	19	1	14	34	113,682	727	707
Nebraska	1	0	1	2	6,608	14	20
Missouri-Iowa	0	0	0	0	0	7	9
Oklahoma	10	1	8	19	59,921	527	628
Texas:							
North Central Texas	11	1	17	29	78,969	590	585
West Texas	10	0	8	18	79,153	393	804
Texas Panhandle	3	0	1	4	12,762	87	201
Eastern Texas	1	0	2	3	17,048	136	193
Texas Gulf Coast	8	0	4	12	95,684	201	397
Southwest Texas	10	0	7	17	90,326	415	627
Total Texas	43	1	39	83	373,942	1,816	2,807
North Louisiana	3	0	4	7	21,694	145	230
Louisiana Gulf Coast	6	0	4	10	83,104	172	257
Total Louisiana	9	0	8	17	104,798	317	487
Arkansas	2	0	2	4	17,818	114	72
Mississippi and Southeast	0	0	2	2	11,635	44	28
Montana	4	0	0	4	10,977	87	76
Wyoming	0	0	0	0	0	52	45
Colorado, Utah	0	0	0	0	0	6	5
New Mexico	5	1	0	6	19,632	103	118
California	19	1	2	22	62,299	598	380
Total United States	189	38	111	338	1,110,464	7,680	8,908
Total previous week	176	35	117	328			
Week ended June 27, 1942	164	25	121	310			

CANADIAN FIELDS

Northern Operations Open Up Large Field Near Fort Norman

CHATHAM, Ont.—The veil of censorship which has covered the drilling and pipe-line operations in the Fort Norman field for the past year was lifted last week when Capt. Freeman C. Bishop, public relations officer for the Northwest Service Command of the U. S. Army, disclosed some of the details of the project which, it is expected, will be completed this year. Known as the "Canol project," abbreviated for Canadian Oils, the development was started last year and has been under the direction of Brig. Gen. James A. O'Connor, commander of the Northwest Service Command.

The nucleus of the project was the two producing wells at Fort Norman on the Mackenzie River, the discovery well having been drilled by Imperial Oil more than 20 years ago, and the second well some years later. A small refinery, recently enlarged, provided sufficient diesel oil and some aviation gasoline to meet the limited needs of the Canadian North.

The Canol project was undertaken as a military project by United States engineers under an agreement with the Canadian Government which retains ownership; the purpose being to provide as rapidly and conveniently as possible the fuel needed for transportation and aviation along the Alaska Highway. Drillers and drilling equipment were flown into the North in the spring and summer of 1942, and a great deal of necessary material was moved north by rail and river craft during the short navigation season on the northern waterways.

Drilling operations began in the early part of 1942. No details have been made public as to the number of wells drilled, or their individual production, but it is stated that wells were drilled in widely scattered locations, wherever there seemed good prospects of oil, with a view to outlining the extent of the field. The field is not yet outlined as all wells so far drilled have been producers. The two original wells had an aggregate potential of around 140 bbl. a day or less, and the production now definitely proven is stated to be many times that amount. At the same time Hon. C. D. Howe, federal minister of munitions and supply, states that the field, while very fine, could hardly be classed as one of the great oil fields of the world, and he doubted if it would compare with Turner Valley, which has a daily average between 26,000 and 27,000 bbl.

The Imperial discovery well, on the east side of the Mackenzie River at Bosworth Creek got its original production in the Fort Creek shales at 783 ft., with a flush of 100 bbl. a day; ultimately it was deepened to 1,025 ft. ft. There are two main producing horizons in the Devonian limestone. The crude is a fairly light product, around 36° Be. Tests were drilled in several directions from the discovery, and some at a considerable distance, operations being continued throughout the year. The latest available official production figure shows an output of 17,374 bbl. for March and 38,037 bbl. for the 3 months of 1943, compared with 129 bbl. in the same period last year. The March figures represent the highest production yet recorded, averaging 567 bbl. daily. However, as the output is restricted by the lack of storage facilities the potential production of the field is undoubtedly many times the official figure.

A new refinery is being erected in the north country to handle the crude. The output will include high-octane aviation gasoline, motor fuel and diesel and fuel oil.

Materials for the pipe line began to move north last summer, before the field was fully proven. As the country between Fort Norman and White Horse was a wilderness before the Alaska Highway was built, the outlining of a route involved the surveying of hundreds of miles of unknown territory and the location of a feasible pass over the divide. These explorations had to be carried out in December, January and February in the face of an exceptionally severe winter. Seven expeditions were sent out to locate a route, including two parties with horses, two with caterpillar tractors and three with dog sleds. The third dog-sled party discovered a route. Since then a 400-mile pioneer highway has been constructed linking White Horse with the Mackenzie and construction work on the pipe line to parallel this highway is in progress from both ends. The pipe line will be completed some time this year, when the field will go into full production. Drilling operations are still going on, and exploratory work is being carried on closer to the Alaska Highway route, where promising potential oil areas are indicated.

Devonian Test.—In West Central Turner Valley, Devonian Test 1, LSD 2, 25-19-3w5, has discontinued drilling at 8,978 ft.

Three Hills.—Calgary & Edmonton Corp. of Winnipeg and Imperial Oil are undertaking a search for oil structures in the Three Hills area, about 45 miles north and 35 miles east of Calgary. Reservations from the Alberta government of about 80,000 acres will be surveyed and tested on a 50-50 basis. A core-drilling outfit is carrying on structure tests.

Kinsella. — In the Kinsella field, Phillips Petroleum has completed two wells and has spudded No. 3, in LSD 4, 4-49-14w4. When No. 3 is completed, production tests of all three wells will be made. The company is also starting a drilling program in the Vermilion field, where it has holdings sufficient for 16 wells, of which the first will spud early in July. A geological survey will be undertaken on a reservation of 20,000 acres in the Cypress Hills area of southern Alberta, near Thelma, where the company has a drilling option.

DAILY AVERAGE PRODUCTION FOR WEEK

	June 26 crude oil	June PAW quota all oils	June 19 crude oil
Arkansas	75,150	72,800	75,750
California	763,250	823,300	780,300
Colorado	6,040	7,000	6,800
Eastern fields	99,300	111,500	101,100
Illinois	216,500	246,200	226,900
Indiana	15,250	15,500	14,100
Kansas	306,950	300,000	302,200
Louisiana	325,550	330,800	326,650
North Louisiana	*84,700*		*85,800*
Louisiana	*240,850*		*240,850*
Michigan	54,400	58,900	54,390
Mississippi	53,100	50,000	53,400
Montana	21,700	22,300	20,915
Nebraska	2,000	2,400	2,100
New Mexico	101,100	105,700	98,600
Oklahoma	339,400	373,500	334,100
Texas	1,497,700	1,602,000	1,496,800
East Texas	*334,900*		*334,900*
West Texas	*228,950*		*228,950*
North Central Texas	*131,800*		*131,800*
East Central Texas	*123,500*		*123,500*
Texas	*90,100*		*90,100*
Texas Gulf Coast	*514,550*		*514,550*
Southwest Texas	*73,900*		*73,900*
Wyoming	97,695	97,000	96,500
Total United States	3,975,085	4,218,900	3,990,605
Total production Jan. 1-June 26, 1943		693,295,000 bbl	
Same period last year		672,733,305 bbl	

CALIFORNIA

South Midway Field Extended 1½ Miles North

LOS ANGELES, Calif. — Chanslor-Canfield Midway Oil Co. extended the productive limits of the South Midway field of Kern County this week by completing No. 9-6 in 6-32s-23e, flowing 415 bbl. of 20.3-gravity oil daily from 3,452 ft. and in doing so has proved up possibly 20 additional locations. This extension well is located less than 1 mile south of the town of Fellows.

The importance of this completion is at present clouded as dry holes to the north, east and southeast tend to define the limits of production in those directions. It is probable that this completion is producing from the same zone found by Republic Petroleum about 1½ miles to the south in 18-32s-23e, and if so Chanslor-Canfield Midway Oil Co. and Republic Petroleum will substantially increase their crude-oil reserves. That the new zone extends southward is further indicated by the fact that Republic has an excellent well in 7-32s-23e, which section lies south of Section 6. Repubic Petroleum and Chanslor-Canfield Midway Oil Co. have pioneered this immediate area and both will show increased reserves depending on how extensive the new zone proves to be. Chanslor-Canfield is the operating company for oil land held by Santa Fe Railroad in California and especially in the San Joaquin Valley where large fee acreage is held.

Fresno County. — Amerada Petroleum has recompleted 21-8-F Wheatville ranch in the Helm field and may have proved up the existence of a new zone. This well was originally completed a few weeks ago producing from the Eocene and was recompleted last week producing from the overlying Miocene. The Helm field, discovered by Amerada, has been recnized as a distillate field and consequently production is being held to a minimum. The productive zones in the Helm and Riverdale fields, both located in the same general area, are quite irregular and considerable difficulty is experienced in correlating zones across each field.

Superior Oil Co.'s discovery well in the new Wheatville field located about 4 miles southeast of the Helm field and about 6 miles west of the Riverdale field is at present flowing 90 bbl. of very clean 38.9-gravity oil through a 7/64-in. bean behind a tubing pressure of 800 lb. This well is producing from a Miocene zone probably comparable with productive measures in the Helm and Riverdale fields. Superior is producing from a very thin sand and for this reason the probable importance of this region from an ultimate production standpoint remains to be determined. About 7 miles north of the Helm field, Seaboard, Texas and Union are preparing to begin a new wildcat west of the Raisin City field in Fresno County and spud will be made within the next day or two.

Gas wells. — Amerada completed another gas well in the Lodi gas field which it discovered early this year and has two additional locations for future work. Bankline Oil Co. is also preparing to undertake additional drilling in this area but all drilling will be along conservative lines pending installation of a pipe-line outlet.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: C.C.M.O. Co. 11-5 Belridge, 11-29s-21e, pumped 20 bbl., 14.1-gravity, 30 per cent cut, T.D. 1,325 ft., P.B. 1,070 ft., perf. 990-1,069 ft., completed in South Belridge zone of Pleistocene age.

Shell 62-12 F.K.L., 12-29s-21e, pumped 90 bbl., 13.5-gravity, 15 per cent cut, T.D. 1,116 ft., perf. 949-78 ft., 991-1,043 ft., 1,070-97 ft., 1,105-15 ft., completed in South Belridge zone of Pliocene age.

Buena Vista Hills, Kern County: Union 18 McLeod, 34-31s-23e, pumped 63 bbl. net, 25.2-gravity, 80 per cent cut, T.D. 3,600 ft., perf. 2,945-73 ft., 3,173-3,275 ft., 3,491-3,592 ft., completed in Buena Vista Hills zone of Pliocene age.

Coalinga, East, Fresno County: Shell 165-29 fee, 29-19s-15e, pumped 125 bbl., 17.3-gravity, 1 per cent cut, T.D. 2,345 ft., perf. 2,246-75 ft., 2,295-2,343 ft., completed in the East Coalinga zone of Miocene age.

Standard 28-25-A fee, 25-19s-15e, pumped 193 bbl., 20.9-gravity, 0.9 per cent cut, T.D. 4,126 ft., P.B. 3,905 ft., 60 mesh perf. 3,865-3,900 ft., completed in East Coalinga zone of Miocene age.

Coalinga, West, Fresno County: Standard 105-13-D fee, 13-20s-14e, pumped 57 bbl., 13.5-gravity, 13 per cent cut, T.D. 1,400 ft., 60 mesh perf. 971-1,395 ft., completed in West Coalinga zone of Pliocene age.

Chowchilla wildcat district, Madera County: Pure 1 Gamboni, 28-10s-13e, abandoned as not commercially productive, T.D. 6,428 ft., first Panoche sand 5,963 ft., second Panoche sand 6,365 ft., form. test 5,962-97 ft., recovered mud and salt water, steady gas flow, form. test 3,715 ft., recovered mud and salt water.

Kern Front, Kern County: General Petroleum 1-17 Sill, 26-28s-27e, pumped 50 bbl., 14.9-gravity, 30 per cent cut, T.D. 2,243 ft., P.B. 2,188 ft., perf. 2,067-2,188 ft., completed in Kern Front zone of Pliocene age.

Honolulu Oil Corp. 58 Kern Front, 8-28s-27e, pumped 46 bbl., 13.9-gravity, 23 per cent cut, T.D. 2,981 ft., P.B. 2,932 ft., perf. 2,760-2,916 ft., M point 2,508 ft., N point 2,632 ft., R point 2,760 ft., Kern Front zone of Pliocene age.

Standard 12-9 fee, 9-28s-27e, pumped 150 bbl., 14.1-gravity, 4.5 per cent cut, T.D. 2,835 ft., perf. 2,550-2,833 ft., completed in Kern Front zone of Pliocene age.

Lodi gas field, San Joaquin County: Amerada Petroleum Corp. 10-1 Lodi Community, 10-4n-7e, flowed 4,100,000 cu. ft. natural gas, no oil, 32/64-in. bean, flowing pressure 739/900 lb., S.I. pressure 932/935 lb., T.D. 4,495 ft., perf. 2,300-10 ft., bottomed in basement rocks, completed in Lodi gas zone of probable Eocene age.

Midway-Sunset, Kern County: C.C.M.O. Co. 79-6 fee, 6-32s-23e, flowed 415 bbl., 20.3-gravity, 3 per cent cut, 20/64-in. bean, pressures 125/250 lb., T.D. 3,452 ft., 140 mesh perf. 2,915-3,100 ft., completed in Republic zone of Pliocene age.

Honolulu 8 E. & M., 10-31s-22e, pumped 5 bbl. net, 11.9-gravity, 40 per cent cut. T.D. 531 ft., 200 mesh perf. 315-485 ft., completed in Midway zone of Pliocene age.

Honolulu 38-A E. & M., 10-31s-22e, abandoned as dry hole, T.D. 1,235 ft., oil zone was absent at this location.

Richfield 10 Fairfield, 11-31s-22e, pumped 119 bbl., 15.5-gravity, 1.2 per cent cut, T.D. 1,333 ft., P.B. 1,270 ft., completed in Midway zone of Pliocene age.

Standard 70-31-E fee, 31-12n-23e, pumped 96 bbl., 27.6-gravity, 3 per cent cut, T.D. 2,300 ft., perf. 2,282-98 ft., completed in Midway zone of Pliocene age.

Texas 16 M. & S. Pool, 36-31s-22e, pumped 12 bbl., 19.4-gravity, 3.4 per cent cut, T.D. 2,450 ft., perf. 1,922-42 ft., 1,960-63 ft., 1,976-83 ft., 1,990-2,000 ft., completed in Midway zone of Pliocene age.

LOS ANGELES BASIN

Orange County.—Signal Oil & Gas Co. appears to have missed the Townsend oil zone in the Newport Beach section as the bit is already down 3,150 ft. with nothing to show in the way of oil or gas. This is substantially deeper than D. W. Elliott found the pay and Signal's wildcat may define the western limits of production. Plans have been completed to extend the area in which drilling operations may be started and the starting of new wells is expected soon. Considerable leasing has been done in this area but most of the leases are small. Standard Oil Co. has finished grading for a deep test to be drilled on the Murphy Whittier property in 26-2s-11w, and an early spud is expected. In the West Coyote field locations have been staked for four new wells on Standard's Murphy Coyote and Emery properties. Drilling operations are showing a slight increase in the Huntington Beach field with considerable remedial work under way.

Los Angeles County.—General Petroleum Corp. is preparing to drill a wildcat in the Norwalk area south of the Santa Fe Springs field and an early spud will be made. This wildcat will be drilled in 12-3s-12w, in about the center of 2,500 acres that have been leased. This is considered an exceptionally good prospect as all wells drilled in that general district have been shallow and of no consequence to the structure to be tested. Drilling operations are showing a slight increase in the Wilmington field reflecting new locations staked by Continental Development Corp., Long Beach Oil Development Co. and Union Pacific Railroad Co. It had been expected that approximately 100 new wells would be drilled at Wilmington during the last 6 months of the current year but present indications point to the drilling of a much lower number unless conditions change and additional drilling is needed.

LOS ANGELES BASIN COMPLETIONS

Huntington Beach, Orange County: Nicolai-Becker Oil Co. 1 fee, 35-5s-11w, pumped 10 bbl., 19.5-gravity, 20 per cent cut, T.D. 3,790 ft., perf. 3,745-80 ft., completed in upper Ashton zone of Pliocene age.

Signal Oil & Gas Co. 44-A Bolsa, 33-5s-

(Continued on Page 90)

ILLINOIS

Big East Iola Well Offset Is Dry in Same Formation

MATTOON, Ill.—Gulf Refining Co. 1 John Pilcher, C NW SW 13-5n-5e, east of the Iola pool in Clay County, and south offset to a 600-bbl. well completed the previous week by Leland Waggoner in McClosky lime, found McClosky lime at 2,412-21 ft. and salt water. The Gulf well was swabbing 24 bbl. per hour of water at the week end.

Central Pipe Line Co., Chris Pearson et al Devonian test in Clinton County, 1 Henry Kluth, SW SW SW 22-2n-1w, was dry in the Devonian lime topped at 2,937 ft., total depth 3,028 ft., and the owners were considering the possibility of testing the Cypress sand.

In the Belle Rive field in Jefferson County Gulf Refining Co. 1 Nathan, C NE NW 27-3s-4e, swabbed 118 bbl. of net oil and 24 bbl. of water after McClosky lime at 3,091-93 ft. was acidized. Testing was continuing.

Of the 29 new operations started in the past week the wildcats were First National Petroleum Trust et al 1 E. Myers, NE NE NW 11-1n-14w, Wabash County; H. H. Weinert 1 W. M. Connell, C NE NW 27-1s-8e, Wayne County, Canterbury and Mabee Drilling Co. 1 H. J. Weaver, SE SE SE 11-1s-9e, Wayne County; Walter Duncan 1 H. H. Hoskins, NW NW NE 21-10n-4e, Shelby County; O. W. Dickerson 1 F. Culp, C SE NE 35-6n-9w, Madison County.

ILLINOIS COMPLETIONS

Wildcats

Clark County: J. E. Thompson 1 Guy Cooper, SW SW SW 18-10-14w, pumped 5 bbl. oil, 25 bbl. water, Casey sand shot at 435-40 ft.

Coles County: Continental 1 Ninna Dailey, C NW SE 35-14n-7e, dry at 3,173 ft., Benoist at 1,772 ft., Renault 1,801 ft., Aux Vases 1,819 ft., Ste. Genevieve 1,832 ft., no McClosky, Osage 2,155 ft., Louisiana 2,820 ft., Chattanooga 2,840 ft., Devonian 2,940 ft.

Oexner 1 Hedges, NW SW SW 6-12n-11e, dry at 1,004 ft., Ste. Genevieve lime at 550 ft.

Edgar County: Tom Peppas 1 J. O. Honnald, NW SW NW 1-13n-14w, dry at 2,214 ft., Trenton lime was topped at 2,167 ft.

Edwards County: Skelly Oil and Nelson Development 1 Grumbell, SE SE SW 3-1s-10e, dry at 3,370 ft., Glen Dean 2,667 ft., Hardinsburg 2,702 ft., Golconda 2,776 ft., Barlow 2,889 ft., Cypress 2,938 ft., Weiler 3,015 ft., upper Paint Creek 3,059 ft., Benoist 3,077 ft., Renault 3,126 ft., Aux Vases 3,199 ft., Ste. Genevieve 3,213 ft., Rosiclare 3,238 ft., Fredonia 3,273 ft., McClosky 3,302 ft., St. Louis 3,345 ft.

Effingham County: J. Watkins et al 1 C. Webster, NW SE NW 34-6n-6e, dry at 2,829 ft., Tar Springs 2,168 ft., upper Glen Dean 2,205 ft., lower Glen Dean 2,240 ft., Golconda 2,302 ft., Barlow 2,391 ft., Cypress 2,439 ft., Weiler 2,496 ft., Benoist 2,584 ft., Renault 2,614 ft., Aux Vases 2,642 ft., Ste. Genevieve 2,698 ft., Fredonia 2,718 ft., McClosky 2,774-80 ft.

Fayette County: Bell Bros. 1 Lilly Visniski, NE SW NE 13-5n-4e, dry at 2,574 ft., Menard 1,820 ft., Waltersburg 1,867 ft., Vienna 1,907 ft., Tar Springs 1,928 ft., upper Glen Dean 2,017 ft., Golconda 2,709 ft., Barlow 2,171 ft., Cypress 2,219 ft., Paint Creek 2,286 ft., Benoist 2,350 ft., lower Renault 2,395 ft., Aux Vases 2,407 ft., Ste. Genevieve 2,459 ft., Rosiclare 2,478 ft., Fredonia 2,490 ft., McClosky 2,520-24 ft. and 2,532-36 ft.

Franklin County: E. S. Adkins 1 Biggs-S, SE SE NE 25-7s-2e, pumped 119 bbl. top of sand 2,026 ft., T.D. 2,096 ft.

Jasper County: Mabee Drilling 1 J. Klinger, SW SW NW 36-5n-8e, dry at 3,155 ft., McClosky lime 3,029-48 ft. and 3,076-89 ft. (dolomite), and 3,103-05 ft. (dolomite).

Jefferson County: E. J. Renwalt 1 Fitzgerrell, NE NE NW 10-4s-3e, dry at 2,946 ft., lower Kincaid 1,775 ft., Menard 2,044 ft., lower Menard 2,073 ft., upper Glen Dean 2,283 ft., Hardinsburg 2,335 ft., Golconda 2,393 ft., Barlow 2,515 ft., Cypress 2,543 ft., Paint Creek sand 2,661 ft., upper Renault 2,722 ft., lower Renault 2,776 ft., Aux Vases 2,798 ft., Ste. Genevieve 2,845 ft., Rosiclare 2,875 ft., Fredonia 2,922 ft.

Shelby County: George Wakefield 1 Krumreich, NW SW SE 28-10n-5e, dry at 2,161 ft., Cypress 1,819 ft., Paint Creek 1,915 ft., Paint Creek sand 1,955 ft., Aux Vases 2,014 ft., Ste. Genevieve 2,050 ft., Fredonia 2,083 ft., no McClosky.

Washington County: Texas 1 C. L. Kokish, SW SW SE 32-2s-4w, dry at 2,485 ft., Benoist 1,027 ft., Ste. Genevieve 1,215 ft., St. Louis 1,258 ft., Salem 1,416 ft., Osage 1,800 ft., Louisiana 2,324 ft., Devonian 2,339 ft.

Fields

Boulder, Clinton County: Texas 6 C. Murphy, C SE NE 2-2n-2w, pumped 414 bbl. oil, 35 bbl. water, Devonian lime top 2,650 ft., T.D. 2,707 ft.

Calvin, White County: McBride, Inc., 7 G. P. Calvin, NE NE SW 6-4s-14w, pumped 73 bbl., Penn sand shot at 1,543-53 ft., T.D. 1,556 ft.

Dundee, Jasper County: F. Jablonski 1 Sam Brown, E½ SW SE 12-5n-9e, pumped 20 bbl. oil, 14 bbl. water, McClosky lime 2,954-59 and 2,968-71 ft., T.D. 2,980 ft.

Friendsville, Wabash County: Magnolia 1 J. E. Majors, NE SE NW 34-1n-13w, dry at 2,790 ft., upper Glen Dean 2,141 ft., Golconda 2,258 ft., Barlow 2,358 ft., Cypress 2,378 ft., Paint Creek 2,530 ft., Ste. Genevieve 2,649, Levias 2,655 ft.

Keensburg, Wabash County: Case-Pomeroy 15 Neil, SW SE SW 7-3s-13w, pumped 68 bbl., Cypress sand 2,486-2,512 ft., Weiler sand 2,543-49 ft., shot at 2,491-2,503 ft., T.D. 2,570 ft.

Mount Carmel, Wabash County: W. C. McBride, Inc., 1 Standing, NE NE NE 17-1s-12w, pumped 10 bbl. oil, 2 bbl. water, Cypress sand 2,023-33 ft., shot, T.D. 2,333 ft.

New Harmony, White County: Central P. L. 1 Dennis, SE NE SE 15-4s-14w, dry at 2,640 ft., Cypress sand 2,626-40 ft.

North Calvin, White County: N. V. Duncan, 2 Bische-Metcalf, NW SE SE 31-3s-14w, pumped 65 bbl., Waltersburg sand 2,268-83 ft., T.D. 2,284 ft.

W. C. McBride, Inc., 2 Anna, SE SE NW 6-4s-14w, pumped 218 bbl., Biehl sand shot at 1,532-62 ft., T.D. 2,372 ft.

North Sims, Wayne County: Texas 6 B. Talbert, NE NE NE 17-1s-6e, pumped 306 bbl., 154 bbl., 130 bbl. on successive tests, pay Levias lime at 3,083-92 ft. and McClosky lime at 3,143-47 ft. and 3,131-53 ft., T.D. 3,174 ft.

Olney Richland County: Pure 1 Geitsche, SE NE NW 19-4n-10e, dry at 3,020 ft., Glen Dean 2,363 ft., Barlow 2,513 ft., Cypress 2,536 ft., Weiler 2,568 ft., Benoist 2,772 ft., Aux Vases 2,843 ft., Ste. Genevieve 2,879 ft., Rosiclare 2,904 ft.

Salem, Marion County: Texas 9 J. E. Hamlin, NW SW NE 4-2n-2e, pumped 82 bbl., McClosky lime acidized at 2,129-39 ft., T.D.

South Lawrence, Lawrence County: Dee Bros. et al 2 Mitchell-Levis, NE SE NE

(Continued on Page 90)

MICHIGAN

Shortage Developing as Big Fields Decline

SAGINAW, Mich.—With Michigan's June and July crude-oil production expected to show a decline of around 3,600 bbl. a day as compared with May, state officials have expressed new concern about the supply situation. The decrease is due to the state's action in reducing proration schedules in the Reed City and Headquarters pools. F. R. Frye, state petroleum engineer, estimates June production at 53,355 bbl. a day, that for July at 55,370 bbl. He explained that new production in the Woodville pool in Newaygo County would be reflected in the higher July figure with the drilling up of 20-acre units on western Michigan leases also a factor.

Declaring that on the average Michigan refiners have only a 9-day supply of crude on hand, Mr. Frye said the situation will get worse when new pipe lines to the eastern seaboard are completed. He forecast a further gasoline cut for Michigan. Demand for crude is far above the state supply, he added, estimated July demand being 65,480 bbl. a day.

The more extensive development program of the past several weeks continued last week, but results were disappointing as 15 completions resulted in only six new producers, none of them especially good. Best of the new wells is the Ohio Oil Co. Norwich-Newaygo well, 1 Barbas-Modrow, which flowed over 400 bbl. the first 18 hours after being acid treated. A majority of the dry holes were wildcat tests.

MICHIGAN COMPLETIONS

Allegan County, Cheshire Township: Charles J. Smith 1 Lane, C NE SW 14-1n-14w, wildcat, dry, T.D. 1,324 ft.

Bay County, Kawkawlin Township: Gulf Refining Co. 1 Blanche, C S½ SE NW 28-15n-4e, pumping 25 bbl., acidized, T.D. 2,947 ft.

Gulf Oil Co. 1 Nitschke, C N½ SW SW Sec. 27, pumping 15 bbl., acidized, T.D. 2,938 ft.

Clare County, Summerfield Township: Taggart Bros. Co. S-8 State, C SW 9-20n-5w, dry hole, T.D. 1,372 ft.

Jackson County, Concord Township: J. W. Kuhns 1 Richardson, C NW SE 1-3s-3w, wildcat, dry, T.D. 2,204 ft.

Livingston County, Iosco Township: J. T. Norris 1 Stowe, C SW SW 9-2n-3e, wildcat, dry, T.D. 2,097 ft.

Missaukee County, Holland Township: Turner Petroleum Corp. 1 Hemmes, S½ SE NE 8-21n-5w, wildcat, dry, T.D. 4,136 ft.

Montcalm County, Cato Township: Southwest Development Co. 1 Pardoe, NW NE SW 5-12n-8w, wildcat, dry, T.D. 1,344 ft.

Newaygo County, Norwich Township: Ohio Oil Co. 1 Barbas-Modrow, C S½ NW NW 28-15n-11w, 408 bbl. first 18 hr., acidized, T.D. 2,875 ft.

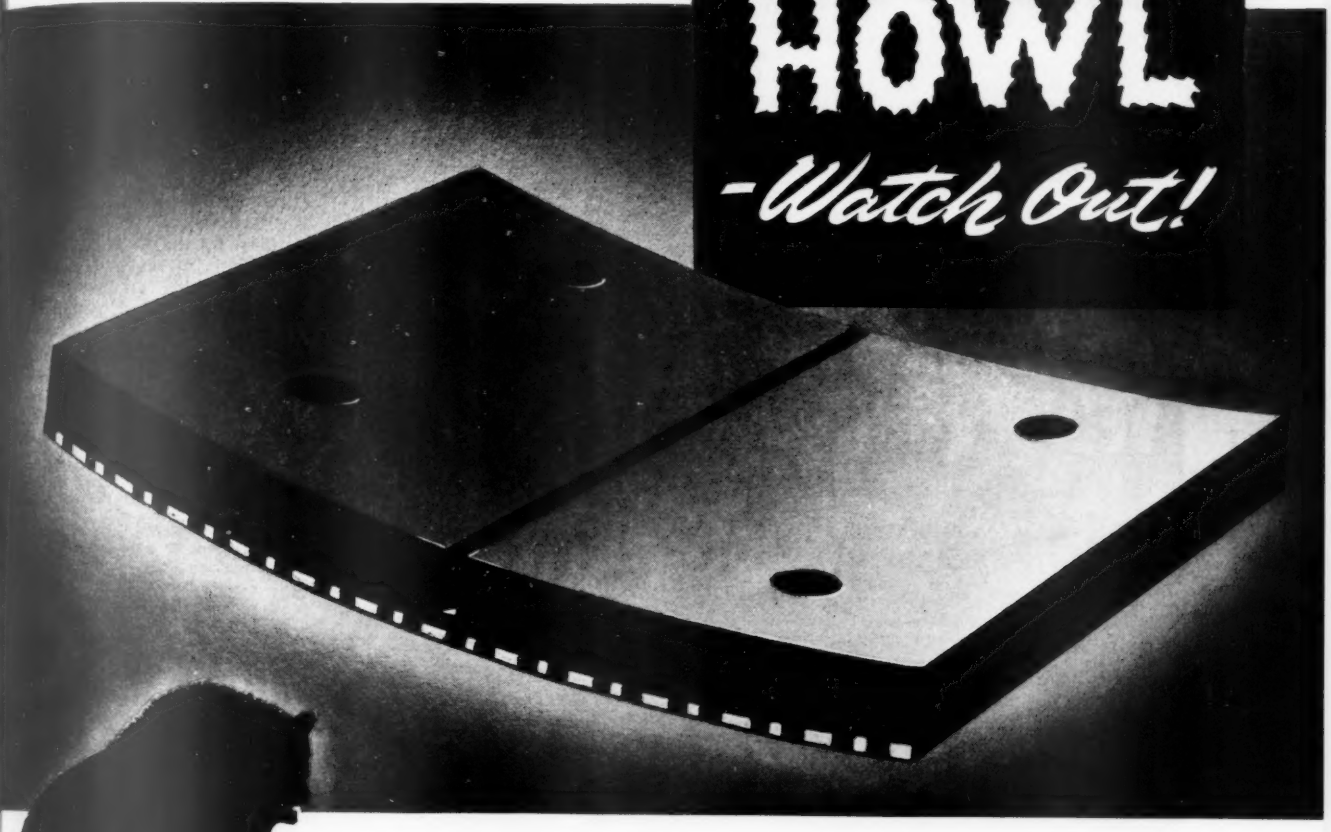
Ogemaw County, Logan Township: R. B.

(Continued on Page 78)

Save Steel by using Grizzly Blocks on *all types* of drawworks.

WHEN BRAKES BEGIN TO HOWL

-Watch Out!



When desired, Grizzly lined steel bands can be supplied.

Carried in stock by leading supply houses for immediate delivery to your rig. Ask your supply dealer.

Grabbing, chattering and screeching brakes are due to imperfect brake action that results in scoring and excessive wear on brake rims. It's the signal for immediate action because, in addition to the costly damage to brake rims, essential steel is being wasted.

New rims are practically impossible to obtain. Give the ones you have the best of care, and protect them against scoring and excess wear by using Grizzly Rotary Blocks. They give smoother action and easier feed-off, will not smoke or dust, and hold the load safely at any depth. Made to exact manufacturers' specifications for *all* types of drawworks - - - Cardwell—Emsco—Franks—National (Ideal)—Oil Well—Wilson - - - *and all other makes.* For detailed information ask for Bulletin No. 16-OF.

GRIZZLY MANUFACTURING COMPANY

Plants: Los Angeles, California and Paulding, Ohio

Complete stocks maintained in our warehouses at Houston, Texas; Oklahoma City, Okla.; Casper, Wyoming.
Export Office: Continental Emsco Co., 30 Rockefeller Plaza, New York, N. Y. Distributed by Leading Supply Houses.

GRIZZLY ROTARY BRAKE BLOCKS

TEXAS GULF COAST

Casing Set in Wildcat South of Anahuac

HOUSTON, Tex.—Casing was being set at Wynn Crosby Drilling Co. et al 1 J. E. Jackson, 15 miles south of Anahuac, in Chambers County, to test sand logged at 8,090-8,112 ft. showing gas and distillate. Total depth of this wildcat is 9,500 ft. Arkansas Fuel Oil Co. 1 Annie Frankland, in the R. C. Frankland Survey, drilling at 9,350 ft. in hard shale, had reported no shows. Exploratory work in Chambers County has taken on marked activity in recent weeks, most of it south of the Anahuac pool, where several geophysical crews are at work. Shooting options on more than 50,000 acres in the county are said to have been taken. George W. Strake, who opened the big Conroe field, is reported to have acquired a shooting option on the 25,000-acre Jackson ranch. Active wildcat operations are predicted.

Fort Bend County.—Grubb & Hawkins have staked location for 1 Moore, wildcat test, on the northeast flank of the Boling dome. Pure Oil Co. will drill a wildcat, 1 A. C. Woods, 2¼ miles northeast of Fresno. Ray Ranger and Jack W. Frazier were drilling at 4,255 ft. in shale at their 1 E. C. Burney estate, 3½ miles south of Katy. This wildcat topped the Heterostegina at 3,350 ft.

Harris County.—Cities Service Oil Co. 1 Witcher, 3 miles northeast of Alief, perforated the 5½-in. casing at 7,926½-28½ ft. and set 2½-in. tubing at 7,931 ft., with perforated nipple opposite perforations on seal. Screen and liner were not set. The well flowed 20.69 bbl. of oil and 16.93 bbl. of salt water in 14 hours through 7/64-in. choke. Tubing pressure was 1,700 lb. and gas-fluid ratio 12,600. Testing continued. Sun 1 Maggie Mansell, 2½ miles north of Katy, was drilling at 7,630 ft. in shale. Texas 1 L. M. Josey, 3 miles southwest of Cypress, a proposed 8,000-ft. test, was drilling at 6,153 ft. in hard shale.

TEXAS GULF COAST COMPLETIONS

Wildcats

Hardin County: H. B. Hebert and J. B. Cowden 1 E. B. Sternenberger, 5½ mi. NE of Kountze, dry at 7,768 ft.

Matagorda County: Superior Oil Co. of California 1 F. B. Peterson, Burnett & Sojourner Sur., A-13, 154 bbl. fluid (86 per cent distillate, 14 per cent salt water) through ¼-in. choke, T.P. 3,200 lb., gas-oil ratio 38,099, gas volume 5,029,000 cu. ft., perf. 9,754-59 ft., T.D. 11,854 ft. Discovery.

Stanolind 1 J. L. Pydus, J. W. Nexsen Sur., A-65, dry at 9,043 ft.

San Jacinto County: Abercrombie and Magnolia 1 J. C. Brewer, 6½ mi. SW of Shepherd, dry at 11,681 ft.

Fields

Clodine, Fort Bend County: Houston Oil Co. 1 Cinco Ranch, J. Brock Sur., A-110, 172 bbl. through ⅛-in. choke, T.P. 1,200 lb., C.P. 2,250 lb., gas-oil ratio 850, perf. 7,504½-06½ ft., T.D. 7,555 ft., P.B. 7,508 ft.

Dickinson, Galveston County: Bennett & Kenyon 2 B. C. Schroeder, W. G. Banks Sur., A-36, O.W.W.O., old P.B. T.D. 8,095 ft., new P.B. T.D. 8,050 ft., 193 bbl. through 10/64-in. choke, T.P. 1,300 lb., gas-oil ratio 785, perf. 8,000-20 ft.

Benoil 1 E. W. Deats, W. K. Wilson Sur., A-208, O.W.W.O., old P.B. T.D. 8,588 ft., dry at new P.B. T.D. 8,575 ft.

Friendswood, Harris County: Humble 27 Louise M. Beamer, T. Choate Sur., A-12, 794 bbl. through ¼-in. by 6-in. chokes, T.P. 800 lb., S.I. C.P. 800 lb., gas-oil ratio 338, T.D. 6,042 ft.

Harmon, Jackson County: Texas 2 W. W. McCrory, J. F. and M. T. Simmons Sur., A-293, 100 bbl. through ⅛-in. choke, T.P. 875 lb., gas-oil ratio 810, perf. 5,330-43 ft., T.D. 5,600 ft.

Lovell Lake, Jefferson County: Humble 32 Jefferson Land Co., C. Hillebrandt Sur., A-28, 116 bbl. through ⅛-in. by 6-in. chokes, T.P. 850 lb., gas-oil ratio 737, T.D. 7,720 ft.

Oyster Bayou, Chambers County: Sun 5 A. D. Middleton, A. Middleton Sur., 122, A-440, 803 bbl. through ¼-in. by 6-in. chokes, T.P. 1,400 lb., gas-oil ratio 643, perf. 8,306-40 ft., T.D. 8,375 ft., P.B. 8,360 ft.

Saratoga, Hardin County: Rio Bravo 545-C fee, J. F. Cotton Sur., A-174, 10 bbl. and 7 bbl. salt water, pumping, T.D. 791 ft.

Stowell, Jefferson County: Glenn H. McCarthy, Inc., et al 1-A Crawford et al, T.&N.O.R.R. Co. Sur. 161, A-373, dual completion; from perf. 8,966-84 ft., 178 bbl. through 13/64-in. choke, T.P. 600 lb., gas-oil ratio 1,153; from perf. 8,649-59 ft., 176 bbl. through 10/64-in. choke, C.P. 1,950 lb., gas-oil ratio 2,212; T.D. 9,055 ft., P.B. 8,990 ft.

Sinclair Prairie 1 J. E. Josey et al, B. A. Vacocu League, A-53, dry at 10,200 ft.

Where breakdowns are costly...
VELVETOUCH delivers the goods
VELVETOUCH is proving its dependability on America's far-flung battle fronts. This remarkable all-metal friction material stands up under the tremendous heat and pressure in the transmissions in U. S. Army tanks, making possible the smooth and positive clutch action that leads to victory.
In your field operations, too, you will find that Velvetouch clutch facings and brake linings prevent costly breakdowns. Velvetouch wears 3 to 7 times longer than ordinary friction materials . . . requires fewer adjustments . . . speeds up production.
Specify Velvetouch for your pumping equipment, and for other machinery where you require brakes and clutches that never grab, chatter or slip!
TRADE MARK REG. U. S. PAT. OFF.
Velvetouch
THE S. K. WELLMAN CO.
1374 EAST 51ST STREET
CLEVELAND OHIO U.S.A.
PIONEERS IN PUTTING POWDER METALLURGY TO WORK FOR INDUSTRY

N. CENTRAL TEXAS

Caddo Lime Production Found East of Throckmorton

WICHITA FALLS, Tex.—Anderson-Prichard Oil Corp. and Bruce Sullivan 1 J. M. Batchler estate, SE SE Section 1691, T.E.&L. Survey, wildcat test 12 miles east of Throckmorton, near the Young County line, indicated a new Caddo lime producing area when it bailed 3 bbl. oil and drilling mud from the formation topped at 3,925 ft., fluid level remaining 1,000 ft. off bottom. Bottomed at 3,936 ft., 7-in. casing was cemented at 3,925 ft., and the hole was to be cleaned out and then given an acid treatment. Five miles north of this test, the same operators have staked another wildcat location, NW NE Section 775, T.E.&L. Survey, to be known as their 1 T. A. Waggoner.

Archer County.—Frank Buttram 1 John O'Donohoe, Block 104, A.T.N. C.L. subdivision, 7 miles southeast of Mankins, which has had promising shows of oil in two pays, perforated casing with 60 shots from 4,980-95 ft. and tested only a slight show of oil, and the perforations were being squeezed off. L. T. Burns 14 A. F. Ickert, southwest part of county, in Crawford Pasture subdivision, was drilling below 4,585 ft. after topping Caddo lime at 4,453 ft. with a show of oil from 4,453-65 ft. and taking a drill-stem test which showed 185 ft. of oil and 40 ft. of oil-cut mud in 40 minutes.

Cooke County. — Snuggs, Seitz & McElreath 1 Percy McGeorge, 1-mile south extension to the Walnut Bend pool, perforated with 71 shots from 4,286-4,301 ft., shut in 12 hours filled 750 ft. with oil and 500 ft. salt water, shut in again, and when opened flowed 10 bbl. oil in 45 minutes, with casing pressure at 360 lb., and was testing further.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: Charles E. Morrison 1 D. D. Strange, C 60-ac. tract, Lot 47, Clark & Plumb subd., dry, T.D. 1,232 ft.

Jack County: Youngblood & Foree 1 R. B. Fulcher, 330 ft. from S and W. Z. N. Morrell Sur., Caddo 5,584 ft., Barnett shale 6,205 ft., dry, T.D. 6,512 ft.

Wichita County: Norberg et al (was O. H. Hamer) 1 F. W. Hamilton est., old well drilled deeper, 660 ft. from S and W. N½ Sec. 22, Blk. 7, H.&T.C.R.R. Sur., dry, old T.D. 2,160 ft., K.M.A. 3,870 ft., new T.D. 4,506 ft.

Wilbarger County: British-American Oil Prod. Co. 1 Cora E. Wilkinson, 990 ft. from S, 330 ft. from W, Sec. 103, Waggoner Colony subd., pump 74 bbl., lime pay perf. 119 shots 5,780-5,890 ft., P.B. to 5,917 f.t from T.D. 6,133 ft. Discovery.

Young County: Talbot & Schmitz 5 Pauline Ferguson, 950 ft. from E, 1,300 ft. from N, 358-ac. lease, S. Tynes Sur., elev. 1,132 ft., pump 74 bbl., sand pay 3,402 ft., P.B. to 3,430 ft. from T.D. 3,538 ft. Discovery.

Fields

Allar, Young County: Panhandle Ref. 1-C Allar Co., 4,012 ft. from N, 523 ft. from E, S 1,185 ac. of Sec. 3409, T.E.&L. Sur., flow 6,000,000 cu. ft. gas, Caddo lime pay 3,579 ft., T.D. 3,591 ft.

Archer County: M. T. McLaughlin 1 J. T. Richardson, Lot 14, T. McCoy Sur., dry, T.D. 1,164 ft.

Electra, Wichita County: Paradise Oil 1-D W. T. Waggoner est., Sec. 14, H.T.&B. Sur., junked, T.D. 1,899 ft.

Garvey, Young County: Kerlyn Oil 1 Gillie-Morrison, 528 ft. from S, 825 ft. from W. S. K. Davidson Sur., elev. 1,162 ft., flow 447 ft., lime pay 4,265 ft., perf 29 shots 4,265-4,301 ft., T.D. 4,309 ft.

Illinois Bend, Montague County: Continental Oil 1 E. E. Vaughn, 330 ft. from S. 685 ft. from E. T. Coulter Sur., elev. 748 ft., flow 204 bbl., sand pay 3,466 ft., T.D. 3,471 ft.

Jack County: C. H. Peterson 2 D. R. Sewell, J. B. Irvine Sur., dry, T.D. 351 ft.

A. C. Parks 1-A Coates, William Berryman Sur., dry, T.D. 481 ft.

C. H. Kadane 5 L. Carter, Sec. 3311, T.E.&L. Sur., dry, T.D. 290 ft.

K.M.A., Wichita County: Grace & Grace 5-A Dorris est., 4,550 ft. from SW cor., 800 ft. from W line, Cowherd subd., Sec. 4, H.T.&B. Sur., I.P. 43 bbl., pay 4,035 ft., shot 200 qt., T.D. 4,120 ft.

Sewell, Young County: Henry Zweifel 2 C. H. Holman, 660 ft. from S and W. J. M. Rogers Sur., Caddo 3,899 ft., Marble Falls 4,200 ft., dry, T.D. 4,556 ft.

Thornberry, Clay County: Akin & Dimock 3 Joe Stephenson, Sec. 55, Specht & McCutcheon subd., I.P. 10 bbl., sand pay 1,139 ft., T.D. 1,152 ft.

Akin & Dimock 4 Joe Stephenson, Sec. 55, Specht & McCutcheon subd., dry.

(Continued on Page 90)

AMERICAN FULL ROLLER BEARINGS are *engineered* to give super bearing performance in the most ponderous, powerful equipment, required for extra heavy-duty service. Specifically built to withstand terrific strains and stresses, AMERICAN FULL ROLLER BEARINGS, function smoothly, flawlessly under the most gruelling service conditions. Rugged durability and long life—often outlasting the equipment itself—plus continuous, trouble-free performance, have established their leadership under all conditions requiring bearings capable of withstanding brutal punishment and abuse. Once adopted, no equipment manufacturer has ever had to switch from AMERICANS.

Specify AMERICANS in your next full-roller application. AMERICAN specialized engineering experience is at your service.

AMERICAN ROLLER BEARING COMPANY
PITTSBURGH, PENNSYLVANIA
Pacific Coast Office: 1718 Mayflower St., Los Angeles, Calif.

AMERICAN
Heavy-Duty ROLLER BEARINGS

SOUTHWEST TEXAS

Pettus Sand Production Found in Jim Hogg County

CORPUS CHRISTI, Tex.—Jim Hogg County contributed a new oil pool when M. L. Massingill 1 Yaeger, a rank wildcat 4½ miles south of Hebbronville, swabbed in from the Pettus sand at 3,762-71 ft., making 114 bbl. of oil daily, with no salt water. Tubing pressure was 25 lb., shut-in casing pressure 350 lb., and estimated gas-oil ratio 150. Adjoining lease owners supported the Yaeger test. Two new locations have been staked with a view of extending production. One is Massingill 2 Yaeger, in Tyler Tap R.R. Survey 225. The other is Magnolia Petroleum Co. 1 Florence A. Barfield, approximately 1,100 ft. northwest of the discovery. The South Texas Geological Society has given the name Yaeger to the new field.

Another wildcat strike in South Texas territory is W. L. Goldston 1 Albert Gutierrez, a mile northwest of the Barbacoas field, in Starr County, which tested about 8 bbl. of oil on ¼-in. tubing choke, with the casing sealed off. Total depth is 4,004 ft., with perforations at 2,850-65 ft. Production is from the Vicksburg.

Humble Oil & Refining Co. 4-B Mestena Oil & Gas Co., a Jim Hogg County wildcat 12 miles south of Hebbronville, recovered 90 ft. of drilling mud, 10 ft. of oily mud and some salt water on a 2-minute drill-stem test at 4,474-4,501 ft. This well was drilling at 5,632 ft. in shale.

Live Oak County.—Tests continue at Henderson Coquat 1 W. W. Goebel, which recently opened the Goebel field, 6 miles east of Three Rivers. On a drill-stem test at 7,082-84 ft. the well flowed at the rate of 5 bbl. of 38.5-gravity oil hourly through ⅞-in. choke at the top and ¼-in. choke at the bottom. A mile and a half east of the discovery well the same operator's 1 M. Coquat was drilling below 6,270 ft. It was planned to run an electrical survey at 7,000 ft.

Karnes County.—New wildcat locations include F. M. Frasher Co. 1 Mischener, 2½ miles south of Gillette; Sunray Oil Co. 1 H. A. Discher, 2 miles northeast of Hondo Creek (derrick); H. H. Howell 1 J. Demmer, 3 miles northeast of Gillette.

LOWER GULF COAST COMPLETIONS

Wildcats

Jim Wells County: A. H. and C. L. Rowan 1 Fred Bagnall, 4 mi. NW of Bentonville, dry at 5,613 ft.

Fields

Midway, San Patricio County: British-American 2 D McAngus, Paul subd., Coleman Fulton Pasture Land, 70 bbl. through ¼-in. choke, T.P. 360 lb., S.I. C.P. 600 lb., gas-oil ratio 3,900, T.D. 6,500 ft., P.B. 6,100 ft.

Nordheim, De Witt County: Tide Water, Seaboard and Adams Oil & Gas 2 F. G. Gips, W. A. Moore Sur., A-656, 73 bbl. distillate and 24 bbl. salt water through ¼-in. choke in 20 hr., with 8,600,000 cu. ft. gas and 25 bbl. distillate per 1,000,000 cu. ft. of gas, T.D. 8,399 ft., P.B. 7,170 ft.

Seeligson, Kleberg County: Humble 17 King Ranch-Cabeza, G.H.H. Sur. 47, A-128, 93 bbl. through ⅛-in. choke, T.P. 730 lb., gas-oil ratio 1,173, T.D. 6,736 ft.

Seeligson, Jim Wells County: Sun 10 J. W. Miller, Willis Millican Sur. 335, A-281, 114 bbl. through 7/64-in. choke, T.P. 1,075 lb., S.I. C.P. 1,275 lb., gas-oil ratio 850, perf. 5,908-13 ft., T.D. 5,924 ft.

Transwestern 4-B Seeligson estate, H. D. Koopman Sur. 235, A-276, dual completion from perf. 4,915-20 ft. 114 bbl. through 5/32-in. choke, C.P. 410 lb. gas-oil ratio 530; from perf. 6,121-25 ft., 98 bbl. through ⅛-in. choke, T.P. 690 ft., gas-oil ratio 734, T.D. 6,250 ft.

Stratton, Kleberg County: Humble 28 King Ranch-Paso Ancho, Santa Gertrudis grant, A-102, 18.94 bbl. through ½-in. choke, T.P. 1,700 lb., C.P. 2,500 lb. gas-oil ratio 12,414, T.D. 6,574 ft.

Humble 36 King Ranch-Paso Ancho, Santa Gertrudis grant, A-102, 63.56 bbl. through ⅛-in. choke, T.P. 1,900 lb., C.P. 350 lb., gas-oil ratio 350, T.D. 6,600.

SOUTH CENTRAL TEXAS COMPLETIONS

Fields

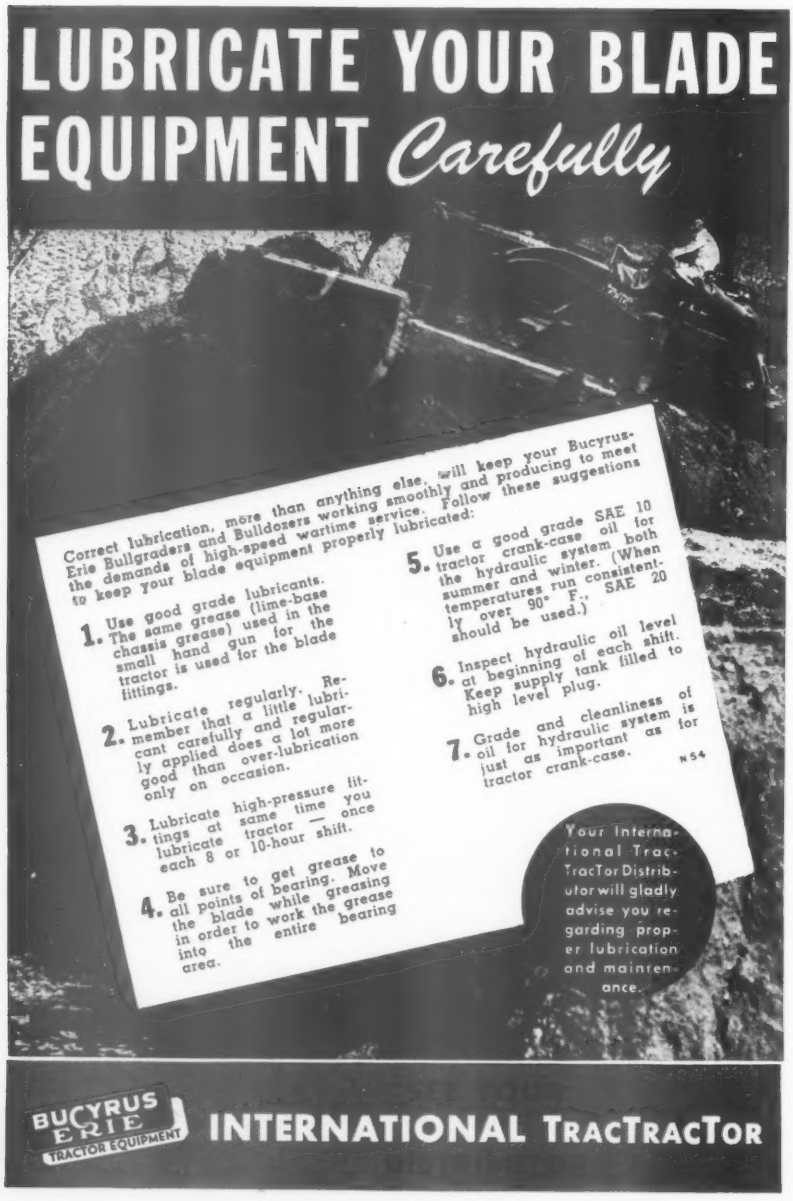
Imogene, Atascosa County: Humble 1 W. H. Coward, Simmons subdivision, Rogue Mauricio Sur. 604, 291 bbl. through ½-in. choke, T.P. 775 lb., S.I. C.P. 960 lb., perf. 7,570-73 ft., T.D. 7,646 ft., extends production 1½ mi. SW.

SOUTH TEXAS COMPLETIONS

Wildcats

Jim Hogg County: M. L. Massingill et al 1 R. Yaeger, 5 mi. S of Hebbronville, 114 bbl. by heads through ¼-in. choke, T.P. 25 lb., S.I. C.P. 350 lb., gas-oil ratio (estimated) 150, perf. 3,762-71 ft., T.D. 3,771 ft. Discovery, field named Yaeger.

Live Oak County: Smith & Story 1 S. S.


LUBRICATE YOUR BLADE EQUIPMENT Carefully
Correct lubrication, more than anything else, will keep your Bucyrus-Erie Bullgraders and Bulldozers working smoothly and producing to meet the demands of high-speed wartime service. Follow these suggestions to keep your blade equipment properly lubricated:
1. Use good grade lubricants. The same grease (lime-base chassis grease) used in the small hand gun for the tractor is used for the blade fittings.
2. Lubricate regularly. Remember that a little lubricant carefully and regularly applied does a lot more good than over-lubrication only on occasion.
3. Lubricate high-pressure fittings at same time you lubricate tractor — once each 8 or 10-hour shift.
4. Be sure to get grease to all points of bearing. Move the blade while greasing in order to work the grease into the entire bearing area.
5. Use a good grade SAE 10 tractor crank-case oil for the hydraulic system both summer and winter. (When temperatures run consistently over 90° F., SAE 20 should be used.)
6. Inspect hydraulic oil level at beginning of each shift. Keep supply tank filled to high level plug.
7. Grade and cleanliness of oil for hydraulic system is just as important as for tractor crank-case.
N-54
Your International TracTor Distributor will gladly advise you regarding proper lubrication and maintenance.
BUCYRUS ERIE TRACTOR EQUIPMENT
INTERNATIONAL TRACTRACTOR

Dunn, 5 mi. SE of Oakville, dry at 3,928 ft.

Zapata County: Texas 1 Bert Hartman, 5 mi. W of Guerra, dry at 2,447 ft.

Aviator, Webb County: George Buck 1 Puig Bros., Alberca de Arriba grant, A-1996, dry at 1,863 ft.

Fields

Cadena, Duval County: Taylor Refining Co. 4 E. E. Cadena, Sur. 304, dry at 4,207 ft. in sidetracked hole.

Chaparosa, Jim Hogg County: R. DeLange and L. Purnell 1 T. T. East, El Randado grant, A-113, dry at 3,471 ft.

North Rincon, Starr County: Sun 4 Callie Hall, R.T. Co. Sur. 223, dry at 6,505 ft.

Rincon, Starr County: Continental and W. R. Davis Co., Inc., 5-D M. M. Garcia, W. D. Stephenson Sur., 128 bbl. in 15 hr. through ⅛-in. choke, T.P. 1,130 lb., C.P. 1,440 lb., gas-oil ratio 3,918, T.D. 3,892 ft.

EASTERN TEXAS

Distillate Found in Pettit Lime on Carthage Structure

DALLAS, Tex. — Union Producing Co. 1 Black C, Black Survey, 4 miles north of Carthage, Panola County, was flowing 240 bbl. distillate per day, with 15,000,000 cu. ft. gas, from Pettit lime pay perforated with 100 shots from 5,690-5,710 ft. Top of the Pettit 5,684 ft., porosity was logged at 5,699 ft., with Travis Peak topped at 6,180 ft. The hole was carried to total depth 6,596 ft. The new well is on the west side of a huge gas-producing structure.

Franklin County. — Humble Oil & Refining Co. 1 J. F. Hague will be a Travis Peak test in south Franklin County, in the Joseph B. Riddle Survey, near Winfield, 5 miles southeast of Mount Vernon, on the Titus County line. It is scheduled to go to 7,500 ft.

Freestone County. — Two miles northwest of Fairfield, and 5 miles southwest of the Carter-Gragg Oil Co. 1 Steward gas discovery. R. L. Wheelock has staked his 1 F. E. Hill heirs, 1,980 ft. from southerly southwest line, and 660 ft. from the southerly east line.

Hunt County.—Humble Oil & Refining Co. 1 F. F. Graham, Smackover lime test on west side of Weil-and pool, in William Elam Survey, was nearing its objective in drilling below 9,000 ft.

Kaufman County.—Sun Oil 1 Rutledge, Parsons Survey, was drilling below 7,500 ft. in shale, no change.

EAST TEXAS COMPLETIONS

Wildcats

Panola County: Rogers Lacy 1 Burnett Bros., 3,150 ft. from E line of J. Oliphant Sur., 786 ft. from N of J. McPhale Sur., Gloyd 5,079 ft., Pettit 5,600 ft., Travis Peak 6,048 ft., dry, T.D. 6,509 ft.

Rusk County: J. Z. Werby 1 Crawford-Weatherby unit, R. Gray Sur., dry, T.D. 4,198 ft.

Fields

Quitman, Wood County: Barnsdall Oil 1 G. R. Blalock, 660 ft. from W, 628.8 ft. from N and S, 40.36-tc. tract, S. G. Purse Sur., flow 616 bbl., pay 6,254 ft., T.D. 6,341 ft.

THOMAS FLEXIBLE COUPLINGS

Last a Lifetime Without Maintenance

1 NO WEARING PARTS

2 NO BACKLASH

3 NO LUBRICATION

High quality in flexible couplings is as important to you as good construction in prime movers and connected machines. Built to suit any standard as well as special applications, Thomas Flexible Couplings protect the very vitals of large or small equipment. Not only will the couplings last a lifetime without maintenance, but they will add years of life and permit continuous production from your costly engines, motors, and turbines, as well as the expensive machines they drive. It will be well worth your while to send for a catalog today.

THOMAS
FLEXIBLE COUPLINGS

THOMAS FLEXIBLE COUPLING CO.
WARREN · PENNA.

PERMIAN BASIN, PANHANDLE

Big Gas Flow Reported From Central Pecos County Test

MIDLAND, Tex. — Phillips Petroleum Co. 1 Ada Price, SE NW Section 11, Block 101, T.C.R.R. Survey, 27 miles southeast of Fort Stockton, Pecos County, last week created a lot of excitement among West Texas operators when it was reported to have had a heavy gas show while drilling below 11,561 ft. No information is being released by the operator, and it is not determined what formation, probably Pennsylvanian, carries the gas, but a big blowout preventer was ordered to the location, and mud engineers were called out to condition the mud, and it is the opinion that the gas flow was considerable. Plans are to core ahead from the present depth as soon as blowout preventer has been installed. Nearest oil production to Phillips 1 Price is in the Taylor-Link pool, 17 miles northeast, which produces from the upper Permian zones at 1,000 ft. to 1,600 ft. The wildcat is 27 miles due south of the Wentz pool, producing from the Ordovician formations, and is separated from it by a granite ridge approximately 4,500 ft. below the surface, running in a westerly-easterly direction. It is one of the deepest holes ever drilled in West Texas. Elevation is 3,257 ft.

Standard Oil Co. 1 Douglas Oil Co. et al, SE SE Section 9, Block 194, G.C.&S.F. Ry. Survey, prospective Simpson pool opener on the west flank of the Yates field, took drillstem test from 8,900-9,114 ft., recovering 840 ft. of sulfur water, and was preparing to plug back to approximately 8,800 ft., set 7-in. casing, and perforate opposite shows of oil from Simpson at about 8,700 ft. Culberston & Irwin 1 R. G. Heiner, Section 589, G.C.&S.F. Ry. Survey, ½ mile southwest extension to Heiner pool, acidized 4,000 gal. acid and was flowing 15 bbl. per hour, half oil and half wash water.

Crane County. — A new pay was seen for the Sand Hills pool when Magnolia Petroleum 21 P. J. Lea, SE NW Section 16, Block 32, Public School Lands, dry at total depth of 6,518 ft., plugged back to 4,905 ft. and swabbed at the rate of 88 bbl. per day after treating pay section from 4,810-4,905 ft. with 2,000 gal. acid. The regular pay section comes in at about 4,400 ft. and did not indicate production in this well. Completion for 17 bbl. per day was effected at Gulf Oil Corp. 1 W. A. Estes, western Crane County wildcat which was plugged back to the Holt pay from a total depth of 7,777 ft.

WEST TEXAS COMPLETIONS

Wildcats

Crane County: Gulf Oil 1 W. A. Estes, 662 ft. from W, 1,998 ft. from S, Sec. 2, Blk. B-28, Public School Land, elev. 2,529 ft., pump 17 bbl., 4 per cent water, 34.7° gravity, Holt pay 3,830 ft., shot 3,825-80 ft., P.B. to 3,885 ft. from T.D. 7,777 ft. Discovery.

Crockett County: Moore Bros. and Olson Oil 2-A H. M. Halff est., 660 ft. from N and E, Sec. 64, Blk. 1, I.&G.N.R.R. Sur., elev. 2,710 ft., dry, T.D. 1,874 ft.

Pecos County: Gulf Oil 1 Roy Girvin, NW SW Sec. 60, Blk. 11, H.&G.N.R.R. Sur., granite 4,535 ft., dry, T.D. 4,537 ft.

Ungren & Frazier 1 White & Baker, 330 ft. from S and E of lease, Sec. 67, Blk. 194, G.C.&S.F.R.R. Sur., dry, T.D. 1,615 ft.

Scurry County: W. S. Guthrie 1 H. C. Wren, 660 ft. from N and W, Sec. 292, Blk. 97, H.&T.C.R.R. Sur., elev. 2,527 ft., dry, T.D. 4,008 ft.

Fields

Embar, Andrews County: Phillips Pet. 41 University-Andrews, SW SE Sec. 20, Blk. 10, University Sur., elev. 3,238 ft., dry, T.D. 6,273 ft.

Emperor, Winkler County: Skelly Oil 57 S. M. Halley, 330 ft. from N, 1,650 ft. from E, Sec. 13, Blk. B-12, Public School Land, elev. 2,772 ft., flow 989 bbl., pay 2,710 ft., shot 275 qt., 2,716-2,849 ft., T.D. 2,849 ft.

Fullerton, Andrews County: Ohio Oil 1 University, NW NW Sec. 5, Blk. 14, University Sur., lost hole, T.D. 5,291 ft.

McCamey, Upton County: McAlester Fuel 11 M. L. Baker, 660 ft. from S, 330 ft. from W, Sec. 7, Blk R, M. S. Denton Sur., elev. 2,795 ft., I.P. 363 bbl., pay 2,340 ft., T.D. 2,420 ft.

Slaughter, Cochran County: Devonian Oil 32-A Duggan, 510 ft. from N and E, Lab. 7, Lge. 55, Oldham County School Land, flow 1,043 bbl., lime pay 4,988 ft., acid 12,000 gal., T.D. 4,038 ft.

Devonian Oil 21-B Duggan, 510 ft. from S and W, Lab. 22, Lge. 55, Oldham County School Land, elev. 3,658 ft., I.P. 204 bbl., lime pay 5,037 ft., acid, T.D. 5,061 ft.

Superior Oil Co. 10 Carrie Slaughter Dean, 1,573 ft. from S, 2,078 ft. from E, Lge. 57 Martin County School Land, elev. 3,678 ft., flow 379 bbl., lime pay 4,904 ft., acid 6,000 gal., T.D. 4,975 ft.

Slaughter, Hockley County: Texas Pacific Coal & Oil 3 Rains County, 440 ft. from S and E, Lab. 5, Lge. 42, Rains County School Land, elev. 3,595 ft., flow 483 bbl., lime pay 4,884 ft., acid 10,000 gal., T.D. 4,930 ft.

Wasson, Yoakum County: De Kalb Agric. Ass'n. 1-A Annie Armstrong, 555 ft. from N and W, Sec. 869, Blk. D, J. H. Gibson Sur., elev. 3,549 ft., dry, T.D. 5,154 ft.

De Kalb Agric. Ass'n. 6 Annie Armstrong, 555 ft. from N and W, Sec. 28, Blk. C-35, Public School Land, elev. 3,523 ft., flow 844 bbl., lime pay 5,010 ft., acid 10,000 gal., T.D. 5,075 ft.

De Kalb Agric. Ass'n. 7 Annie Armstrong, 500 ft. from S, 555 ft. from W, Sec. 28, Blk. C-35, Public School Land, San Andres lime 4,630 ft., dry, T.D. 5,089 ft.

Wasson, Gaines County: Oil Development Co. 2-39 fee, 515 ft. from N, 666 ft. from E, Sec. 39, Blk. AX. Public School Land, elev. 3,534 ft., flow 788 bbl., lime pay 4,990 ft., acid 14,000 gal., T.D. 5,050 ft.

Weiner, Winkler County: J. R. Sharp et al 1 S. M. Halley, NW NW SE Sec. 7, Blk. B-11, Public School Land, elev. 3,005 ft., flow 221 bbl., Colby sand pay 3,015 ft., T.D. 3,137 ft.

PANHANDLE COMPLETIONS

Gray County: Magnolia Pet. 227-59 fee, Sec. 14, I.&G.N.R.R. Sur., dry, T.D. 3,150 ft.

Hutchinson County: J. M. Huber Corp. 9 Bryan, 4,053 ft. from S, 2,970 ft. from W, Sec. 2, Blk. M-24, T.C.R.R. Sur., elev. 3,354 ft., I.P. 132 bbl., pay 3,255 ft., T.D. 3,259 ft.

Sinclair Prairie Oil 17 Maggie Weatherly, 1,980 ft. from N, 510 ft. from W, Sec. 23, Blk. Y, A.&B. Sur., elev. 3,089 ft., I.P. 289 bbl., pay 3,027 ft., T.D. 3,072 ft.

Skelly Oil 3 Crosby & Hatcher, 3,089 ft. from N, 330 ft. from W, Sec. 3, Blk. M-24, T.C.R.R. Sur., elev. 3,354 ft., I.P. 162 bbl., 17 per cent water, pay 3,265 ft., T.D. 3,281 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Derrick was being erected on a rank wildcat venture in Chaves County, 27 miles east of Roswell, by DeKalb Agricultural Association. It is located in 35-10s-28e, and is scheduled to go to 7,500 ft. This depth should test the Ordovician beds. A new Delaware sand discovery was promised in Eddy County by Schuster & Messinger 1 Page, NW SW 15-21s-28e, 9 miles northeast of Carlsbad, which had sand from 2,638-44 ft., and bailed 41 bbl. of 44-gravity oil, after standing 2½ hours. Seven and one-half inch casing was cemented at 2,514 ft. The prospect is 45 miles northwest of the Kyle pool, producing from the Delaware sand, in Loving County, Texas.

SOUTHEAST NEW MEXICO COMPLETIONS

Maljamar, Lea County: Johney Cockburn 15-B Pearl Miller, NW SW 30-17s-33e, flow 1,040 bbl., lime pay 4,202 ft., T.D. 4,264 ft.

Drlg. & Explor. 4-A Johns, SE SE 24-17s-32e, flow 219 bbl., lime pay 4,040 ft., T.D. 4,350 ft.

Square Lake, Eddy County: B. Cockburn 4 A. N. Etz, SW SE 26-16s-30e, flow 40 bbl., pay 2,970-3,077 ft., T.D. 3,078 ft.

W. F. Dodson 1 Parke, NE NE 3-17s-30e, flow 100 bbl., lime pay 2,970 ft., T.D. 3,035 ft.

W. F. Dodson 2 Parke, NW NE 3-17s-30e, flow 125 bbl., lime pay 2,950 ft., T.D. 3,015 ft.

Michigan Fields

(Continued from Page 72)

Tamblyn Development Co. 1 Everett, NW SE NE 10-22n-4e, wildcat, dry, T.D. 1,570 ft.

Osceola County, Lincoln Township: Louis Rose 1 State, C S½ SW SE 17-18n-10w, dry hole, T.D. 3,809 ft.

Richmond Township: Louis Rose 1 Clark, W½ NW NW 4-17n-10w, pumping 76 bbl., acidized, T.D. 3,534 ft.

Ottawa County, Holland Township: Regal Dutch Petroleum Co. 1 Zeerip-Rietman, C NW SW 36-5n-15w, pumping 2 bbl., acidized, T.D. 1,524½ ft.

Roscommon County, Richfield Township: Gulf Refining Co. 1 State-Richfield, C S½ SE SW 13-24n-1w, wildcat, dry, T.D. 4,300 ft.

Van Buren County, Bangor Township: Harris Oil Co. 2 Piefer, NE NW SW 9-2s-16w, pumping 75 bbl., naturally, T.D. 1,016½ ft.

KANSAS

Two Western Kansas Wells Are Discoveries

TWO wildcats, one in Ellis County and the other in Ness County, were making potential tests last week after showing for small wells. The Ness County well is second pool for the county. This well is Magnolia Petroleum Co. 1 Olson, SE SW SE 33-17-25w, 2 miles north of the Aldrich pool. Mississippi lime was found at 4,264 ft. with oil at 4,267-70 ft.; saturated dolomite was found at 4,284-89 ft., total depth. Operators bailed 17 bbl. of fluid an hour immediately after acid treatment, and latest tests indicated a potential of 808 bbl. of oil and 610 bbl. of water.

Ellis County.—Five miles west of the Burnett pool, Nate Appleman and Harbor Drilling Co. 1 Ranch, SE SE SE 19-11-18w, opened the Riverview pool with a temporary potential of 84 bbl. a day in the Arbuckle lime at 3,609-19 ft., total depth. The hole filled 2,100 ft. with a light gray oil in 12 hours, with no water. Gravity was estimated at 25.6°.

KANSAS COMPLETIONS

Wildcats

Ellis County: Cities Service 1 Rohler, E½ SE NW 10-12-17w, dry, T.D. 3,680 ft., Lansing 3,365 ft., Arbuckle 3,649 ft.

Lebsack, Alexander and Sharon 1 Jensen, SE SE NE 3-13-18w, dry, T.D. 3,698 ft., Lansing 3,422 ft., Arbuckle 3,672 ft., 15 gal. oil recovered at 3,682 ft., acidized with no increase.

Ellsworth County: Helmerich & Payne et al 1 J. W. Bean, SE SE SE 13-16-6w, dry, T.D. 3,821 ft., Lansing 2,701 ft., Viola 3,664 ft., Simpson 3,733 ft., Arbuckle 3,797 ft.

Jefferson County: J. O. Isaacs 1 Mary Lowe, NE NW 26-10-19e, dry, T.D. 1,743 ft., Mississippi lime 1,616 ft., Bartlesville 1,529 ft.

Saline County:-Phil-Han Oil 1 Currie, NW NW SW 10-15-1w, dry, T.D. 3,363 ft., Hunton 2,910 ft., Viola 3,167 ft., Simpson 3,222 ft., Arbuckle 3,333 ft.

Stafford County: Falcon-Seaboard 1 Bagley, NE NE NE 24-23-11w, dry, T.D. 3,828 ft., Lansing 3,282 ft., Viola 3,637 ft., Simpson 3,715 ft., Arbuckle 3,777 ft.

Fields

Brandt - Sensenbaugh, Butler County: Rex & Morris 1-B Brewer, NE NE SW 23-28-7e, pumped 50 bbl., Mississippi lime 2,756-63 ft.

Carmi, Pratt County: Shell 1 Briggman, SW SW SW 28-26-12w, flowed 338 bbl. in 15 hr., Arbuckle 4,275-4,314 ft.

British-American 1 Petrowsky, SW SE NE 30-26-12w, flowed 80 bbl. in 4 hr., Arbuckle 4,281-4,311 ft.

Crowther, McPherson County: Westgate-Greenland 2 Pisel, NW SW 26-17-1w, potential 1,097 bbl., Mississippian chat 2,774-90 ft.

Cunningham, Pratt County: Drillers Gas 3 Fitzsimmons, E½ NE SE 34-27-11w, pumped 605 bbl., Lansing 3,498-3,516 ft., T.D. 3,622 ft.

Ellis, Ellis County: Darby Pet. 2-A Huber, W½ SE NW 31-12-20w, pumped 616 bbl., Arbuckle 3,838-48 ft.

Gorham, Russell County: Eldorado Refining Co. 2 Mills, S½ NE SW 12-14-15w, pumped 27 bbl., Lansing 3,043-92 ft., T.D. 3,299 ft.

Frisbie, Pratt County: Gulf 1 Gertrude, NW NE 8-26-13w, dry, T.D. 4,060 ft., Lansing 3,792 ft.

Hunter, Saline County: Deep Rock 1 Threlkeld, NE NE SE 19-16-1w, swabbed 112 bbl. in 4 hr., Mississippi lime 2,683-98 ft.

Kraft-Prusa, Barton County: Winkler-Koch et al 1 Hitchman, NE SE 32-16-11w, dry, T.D. 3,395 ft.

Republic Natural Gas 2 Radenberg, SE SE 8-17-11w, pumped 73 bbl., Arbuckle 3,301-08 ft.

Cities Service 6-A Hogan, NE NE NE 11-17-11w, pumped 448 bbl., Arbuckle 3,395-3,415 ft.

Lindsborg, McPherson County: Vickers Pet. 2 Hoffman, SW SW 25-17-4w, dry, T.D. 3,450 ft., Viola 3,442 ft.

Medicine Lodge, Barber County: Barbara Oil 1 Mark, C NE 19-33-13w, dry, T.D. 5,085 ft., Simpson sand 5,072 ft.

McLouth, Jefferson County: Killness et al 1 Mosberger, NE SE 21-9-20e, 3,500,000 cu. ft. gas, sand 1,414-17 ft.

B. O. Slottman 1 Bankers Life, SE SE 25-9-19e, dry, T.D. 1,473 ft.

McLouth, Leavenworth County: Chas. Miller 3 Bell, S½ SW SW 6-10-21e, pumped 30 bbl., sand 1,352-1,411 ft.

Morel, Graham County: Hollow Drlg. 1 Hedge, SE NE 9-9-21w, dry, T.D. 3,733 ft., Arbuckle 3,717 ft.

Peace Creek, Reno County: Cities Service 3-C Haylum, SW NE NE 12-23-10w, pumped 97 bbl., Viola 3,737-44 ft.

Ray, Phillips County: Cities Service 3-E Reece, SW SE NE 28-5-20w, pumped 389 bbl., Arbuckle 3,562-75 ft., 3,585-91 ft., T.D. 3,704 ft.

Silica, Barton County: Magnolia Pet. 10 Roetzel, N½ SE NE 25-20-11w, pumped 144 bbl., Arbuckle 3,267-74 ft.

Stern, Butler County: H & M Drlg. 2 Tobing, SE SE 21-27-6e, dry, T.D. 3,055 ft.

(Continued on Page 90)

K&E
REG. U. S. PAT. OFF.
STEVENS WYTEFACE A
KEUFFEL & ESSER CO.
WYTEFACE "A"
TRADE MARK
STEEL TAPES
I'LL TAKE THE WHITE ONE EVERY TIME!
Easy-to-read, raised black graduations on crack-proof white surface... resist abrasion from oil, sand, scraping on the pipe pile, etc. In all sizes and types—in cases or reels. Ask your dealer—or write for catalog.
EST. 1867
KEUFFEL & ESSER CO.
NEW YORK • HOBOKEN, N. J.
CHICAGO • ST. LOUIS • SAN FRANCISCO • LOS ANGELES • DETROIT • MONTREAL

PIPE ACCORDING TO THE A. S. A. LAW OF DESIGN

Mono-Cast Centrifugal Pipe can be manufactured in specific weights for specific laying conditions, and in accordance with the recently adopted A.S.A. Law of Design. You get the *exact* pipe your conditions call for.

PROMPT DELIVERIES with suitable priorities.

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM 2, ALABAMA
Sales Offices In Principal Cities

LOUISIANA GULF

Fifth Test in Perkins Area Finds Good Oil Sand

NEW ORLEANS, La. — Importance attaches to the strike made by E. R. Brann at 1 Edgewood Land & Logging Co., Ltd., in 6-8s-10w, Calcasieu Parish, which has started off with production of 165 bbl. of oil daily, through 10/64-in. choke, with tubing pressure of 640 lb., casing pressure 1,540 lb., and estimated gas-oil ratio of 700. This well, completed at total depth of 5,396 ft., plugged back to 5,393 ft., and producing from perforations at 5,368-79 ft., is in the Perkins field, opened in August 1939, but never attaining commercial classification and abandoned 2 years later. Only one well, owned by Humble Oil & Refining Co., was completed as a producer. It was a small gasser, with a little distillate. It was shut in and was not reopened. The deepest well drilled in the field was Humble 2 Edgewood Land & Logging Co., Ltd., which was carried to 9,450 ft. in hard sand and was abandoned in October 1939. Observers say that Brann's well, fifth to be drilled in the area, has apparently converted a noncommercial gas field into an excellent oil field.

Terrebonne Parish.—Completion of Union Producing Co. 1 Fitzpatrick & Vizard, in the De Large field, has been delayed by mechanical trouble, but reports indicate that it is likely to set up a new world record for deep oil production. A test at 13,475-90 ft. showed gas and distillate. Salt water appeared soon after swabbing began, and swabbing was discontinued. The operators say the salt water probably came from a defective cement job on a short string of 5½-in. liner set in the well. The current week was expected to see necessary repairs made. Tubing was pulled, and preparations were being made for a squeeze job.

St. Landry Parish.—At J. S. Abercrombie et al 1 Charles-Community, 2 miles southwest of Leonville, swabbing operations produced 100 per cent salt water. Operator set retainer at 9,545 ft. and squeezed perforations. Preparations then were made to plug back to about 7,500 ft. for another test. Minor showings had been found in this wildcat, which is at total depth of 10,220 ft.

St. Mary Parish.—Following failure of a test in the regular sand at 7,116-20 ft., Pan American Production Co. 24 Laws Community, in the Charenton pool, planned to try opening a new gas and distillate sand at 6,300 ft.

LOUISIANA GULF COAST COMPLETIONS

Fields

Bully Camp, La Fourche Parish: Gulf 3 Delta Securities Co., 53-19s-21e, junked at 8,425 ft. in second sidetracked hole.

Bear, Beauregard Parish: Phillips 1 First National Bank of Beaumont, 27-6s-9w, 348 bbl. through ⅞-in. choke, T.P. 1,420 lb., C.P. 2,310 lb., gas-oil ratio 998, perf. 6,514-18 ft., T.D. 6,569 ft.

Gueydan, Vermilion Parish: Fohs 3 Byron W. Evans, 27-11s-1w, 11 bbl. distillate and 2,140,000 cu. ft. gas through 9/64-in. choke, T.P. 3,500 lb., perf. 9,474-82 ft., 9,485-93 ft., and 9,495-9,508 ft., T.D. 9,698 ft. in third sidetracked hole.

Perkins, Calcasieu Parish: E. R. Brann 1 Edgewood Land & Logging Co., Ltd., 6-8s-10w, 164 bbl. through 10/64-in. choke, T. P. 640 lb., C.P. 1,540 lb., gas-oil ratio (estimated) 700, perf. 5,368-79 ft., T.D. 5,396 ft., P.B. 5,393 ft.

Potash, Plaquemines Parish: Humble 61 Orleans Levee Board, 14-18s-15e, 16.2 bbl. per hour through ⅞-in. choke, T.P. 800 lb., gas-oil ratio 270, perf. 8,233-45 ft., T.D. 8,700 ft., P.B. 8,248 ft.

Roanoke, Jefferson Davis Parish: Union Sulphur Co., Inc., 1-A M. N. Stafford et al, 2-9s-4w, 108 bbl. through ¼-in. choke, T.P. 2,200 lb., gas-oil ratio 5,770, perf. 8,666-74 ft., T.D. 8,800 ft., P.B. 8,670 ft.

Schooner Bayou, Vermilion Parish: Union Oil Co. of California 4-A Louisiana Furs, Inc., 15-15s-1e, O.W.W.O., old T.D. 9,025 ft., dry at 7,462 ft. in fourth sidetracked hole.

Vinton, Calcasieu Parish: Union Sulphur Co., Inc., 6 J. G. Gray estate, 4-11s-12w, dry at 3,552 ft. in second sidetracked hole.

West Bay, Plaquemines Parish: Gulf et al State-P.P., 35-22s-30e, 234 bbl. through 6/64-in. choke, T.P. 4,550 lb., gas-oil ratio 1,180, perf. 10,765-68 ft., T.D. 10,795 ft., P.B. 10,770 ft., new sand for this field.

Wildcats

Orleans Parish: W. T. Burton Co. 9 State, Lake-11s-14e, dry at 9,896 ft.

Terrebonne Parish: Humble 2-B Continental Land & Fur Co., 25-17s-13e, dry at 11,273 ft.

ONE MINUTE TALKS ON

Cleaning Fuel Oil Heaters the Fast, Easy Oakite Way

More uniform spraying of fuel oil and better combustion result when proper heat transfer is maintained in your fuel oil heaters. That is why thick, gummy deposits on tubes that lower heat transfer efficiency should be periodically removed.

Do it this quick, effective way. Circulate solution of recommended Oakite material through unit for required period as directed. No dismantling necessary. Deposits are thoroughly removed . . . normal heat transfer restored. Complete data FREE on request. Write today!

OAKITE PRODUCTS, INC.
44C Thames Street, New York, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* CLEANING
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

ANNOUNCEMENT

We have purchased the rotary drilling equipment patents and patent rights of the well known

BRAUER MACHINE & SUPPLY COMPANY

This equipment consists of

Brauer Release Valves	Tees and Goosenecks
Manifold Valves	Float Joints
Standpipe Valves	Hydraulic Wall Hooks
Long Sweep Ells	Junk Baskets

Complete Brauer Slim Hole Drilling Rig

These and many other items will now be manufactured by us.

BIG FOUR MACHINE AND SUPPLY CO.
CLAY CITY - - - - - - - - - ILLINOIS

Manufacturers and Distributors of Proven Oil Field Products.

OHIO, KENTUCKY

New Pennsylvania Grade Pools in Prospect

ZANESVILLE, Ohio.—Prospects of additional Pennsylvania Grade oil has been improved by two encouraging Clinton sand wells now testing. One drilled by the Preston Oil Co. on the Sunday Creek Coal property in Section 31, Monroe Township, Perry County, is flowing amber oil and will be shot this week. The other, drilled by the Ohio Fuel on the Marie Schneider tract in Section 13, Wayne Township, Muskingum County, is still drilling and making a good showing. The Preston Oil Co. has staked an offset location to the big Johnson well west of Zanesville. The Industrial Gas Co. has staked a wildcat location in Section 6, Bristol Township, Morgan County, on the Aurice Richardson tract.

OHIO COMPLETIONS

Athens County, Ames Township: Carpenter & Glazier 3 M. P. Eddy, Fr. 13, Cow Run, dry, T.D. 92 ft.

Lorain County, Huntington Township: H. C. Bishop 1 A. Rowland, Lot 2, Clinton, dry, T.D. 2,480 ft.

Wellington Township: Ohio Fuel 1 Fred Gutschmidt, Lot 4, Clinton, 84,000 cu. ft. gas, T.D. 2,461 ft.

Medina County, Spencer Township: Ohio Fuel 1 L. H. Colley, Sec. 25, Clinton, 1,510,000 cu. ft. gas, T.D. 2,446 ft.

Morgan County, Bloom Township: Industrial Gas 1 Howard Rex, Sec. 3, Clinton, dry, T.D. 4,486 ft.

York Township: Ohio Fuel 1 William Garrett, Sec. 35, Clinton, 2,280,000 cu. ft. gas, T.D. 4,271 ft.

Muskingum County, Newton Township: Industrial Gas 1 William Thompson, Sec. 17, Clinton, dry, T.D. 3,528 ft.

Noble County, Enoch Township: Gerst Oil & Gas 10 Andrew Gerst, Sec. 20, Berea, 929,000 cu. ft. gas, T.D. 1,615 ft.

Summit County, Copley County: James Upham 1 Cleo Pardee, Lot 23, Clinton, dry, T.D. 3,767 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—A midmonth report swings the eastern Kentucky completion spotlight on Pike County where eight gas wells were reported completed. One of the wells is a 3,000,000-cu. ft. open-flow producer and the report indicates that two others passed the million mark. Four other gas wells were drilled in, two oil wells reported and one dry hole listed in the report.

It is probable that the well completed by Utility Elk Horn Coal Co. on its own No. 8 tract holds the center of interest. The well is on Shelby Creek in Pike County near Virgie and has a daily open flow of 3,000,000 cu. ft. of gas from Maxon but the total depth is not available. The well is south of previous drilling in Pike County and is the third good producing well brought in in the area being developed by the coal firm.

In fact it is within 10 miles of the Letcher County line and its completion points to a continued southern drift in the Pike County operations. One oil well has been brought in also. It is not likely, however, that any leasing campaign will be touched off by this activity as almost all acreage is under lease.

Local sources say that the southern trend up Shelby Creek will certainly be governed by results of other operations now under way and also cite the fact that very few wells have been drilled in Letcher County, and these a number of years ago.

EASTERN KENTUCKY COMPLETIONS

Pike County: Warfield Gas 5152 John Moore on Payton Branch, 164,000 cu. ft. gas at 3,975 ft.

Columbian Fuel GW-1208 Farrell & Hatcher 3, on Bill Williams Creek, 133,000 cu. ft. gas at 3,569 ft.

Columbian Fuel GW-867 Smith heirs 5, Meathouse Fork, T.D. 3,305 ft., 119,000 cu. ft. gas from Berea shale, O.W.D.D.

United Carbon 1094 Colony Coal & Coke Co., Road Fork of Robinson Creek, shale, 1,107,000 cu. ft. gas at 3,203 ft.

United Carbon 9-1024 Ballard Weddington on Buckley Creek, shale, 133,000 cu. ft. at 3,103 ft.

Hamilton Gas Co. H-6 Jeff Smith on Coburn Branch of Pond Creek, dry at 3,163 ft.

Operator Kindred 1 Rebecca Phillips on Island Creek, shale, 696,000 cu. ft. gas at 3,312 ft.

Floyd County: Warfield Gas 5156 Elk Horn Coal Corp. 54, Block 199, shale, 298,000 cu. ft. gas at 3,295 ft.

Jones & Lindsey 1 Bill Burchett, 119,000 cu. ft. gas, O.W.D.D.

Martin County: Warfield Gas 5190 Freeland Vance 2, Peg Fork, Maxon, 9 bbl. at 1,260 ft.

Diederich & Hale 1 Cassady heirs 3, Wolf Creek, Maxon, 12 bbl. oil at 1,397 ft.

Warfield Gas 5194 W. J. Parks, White

(Continued on Page 90)

APPALACHIAN FIELDS

Small Lens Proven in Clarion County, Pa.

PITTSBURGH, Pa. — In Monroe Township, Clarion County, Hill Brothers completed a second test on the Louis Maggy farm, 3,000 ft. southeast of Churchville, in the Clarion sand, total depth 900 ft., and it is showing for 5 bbl. a day. This well is located about 950 ft. southwest of No. 1 which came in good for 25 bbl. a day, and is in line with the nearest production at Reigle School about 4 miles south, 45° west.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Alleghany County, Jefferson Township: Finleyville Oil & Gas F-75 W. E. Shepler, 27,000 cu. ft. gas, Gantz sand 1,770-74 ft., Fifty-foot 1,828-91 ft., T.D. 3,567 ft.

Armstrong County, Kittanning Township: Ralph B. Crumm 1 Louise Louster, 60,000 cu. ft. gas, Bradford sand 3,104 ft., T.D. 3,206 ft.

Clarion County, Monroe Township: Hill Brothers 2 Louis Maggy, 5 bbl., Clarion sand, T.D. 900 ft.

Porter Township: Penna Fuel Gas Co. 1 Weaver heirs, 23,000 cu. ft. gas, through Speechley sand, T.D. 3,307 ft.

Red Bank Township: Owens Illinois Glass Co. 1 S. A. Brozius, 99,000 cu. ft. gas, Murraysville sand, T.D. 1,159 ft.

Fayette County, Menallen Township: Peoples Natural Gas 1 N. R. Moore, 90,000 cu. ft. gas, Fifty-foot sand 2,223 ft., T.D. 3,566 ft.

Greene County, Franklin Township: Manufacturers Light & Heat 1 Lloyd Henderson, 200,000 cu. ft. gas, Bayard sand, 3,153 ft., T.D. 3,206 ft.

Perry Township: James Furman et al 1 fee, dry, Elizabeth sand 2,940-55 ft., show gas only 2,945 ft., T.D. 3,083 ft.

Richhill Township: J. B. Orndoff 1 George Huffman, 600,000 cu. ft. gas, Fifty-foot sand 2,654-60 ft., T.D. 2,668 ft.

Washington County, South Strabane Township: Lewis & Pettit 1 A. C. Renner, 316,000 cu. ft. gas, gas sand 1,435 ft., gas 1,441 ft., 1,451-55 ft., T.D. 1,455 ft.

West Pike Run Township: Bentleyville Fuel Co. 1 John Check, 1,050,000 cu. ft. gas, Bayard sand 2,735 ft., T.D. 2,744 ft.

WEST VIRGINIA

Raleigh County.—In Town district, Raleigh County, Godfrey L. Cabot, Inc., topped the Maxton sand at 2,213 ft. in 1083 Beaver Coal Co. with a gage of 2,627,000 cu. ft. of gas at 2,275-86 ft. which is being cased off.

WEST VIRGINIA COMPLETIONS

Boone County, Washington district: Owens, Libby-Owens 659 C. A. Croft, 113,000 cu. ft. gas, Big lime 1,225 ft., Injun 1,444 ft., Berea 1,939 ft., T.D. 1,981 ft.

Calhoun County, Sherman district: Creed Yoak et al 3 Scotch McDonald, 5 bbl., Big Injun sand, T.D. 2,099 ft.

McCall Drilling Co. 3 T. S. Cunningham (147 acres), 5 bbl., Injun, T.D. 2,240 ft.

Gilmer County, Center district: Carnegie Natural Gas Co. 1581 Lenora Beal Sturm, 283,000 cu. ft. gas, second Salt sand, T.D. 1,442 ft.

DeKalb district: Burgess & Snyder 1 J. W. Woodford, dry, through Maxton sand, T.D. 1,680 ft.

Kanawha County, Poca district: Glenn Dearth 3 Robert Wines, 25 bbl. and 50,000 cu. ft. gas, Big lime, T.D. 1,661 ft.

Lincoln County, Duval district: Cambridge Gas Co. 1 Sweetland L & M Co. (J. A. Holley) 1 bbl., Berea, T.D. 2,429 ft.

Jefferson district: United Fuel Gas Co. 5229 Leonidas Hill, 223,000 cu. ft. gas, Big lime 1,612 ft., Injun 1,800 ft., Berea 2,312 ft., brown shale 3,331 ft., gas from shale, T.D. 3,691 ft.

United Fuel Gas Co. 4201 A. I. Dotson, drilled deeper, 267,000 cu. ft. gas, brown shale, T.D. 3,946 ft.

William O. Ziebold 1 Adkins & Hill, 133,000 cu. ft. gas, Big lime 1,695 ft., Injun 1,908 ft., Berea 2,439 ft., brown shale 3,740 ft., T.D. 3,866 ft.

Washington district: United Fuel Gas Co. 5137 Mohler Lumber Co., 169,000 cu. ft. gas, Big lime 1,409 ft., Injun 1,707 ft., Berea 2,173 ft., brown shale 3,629 ft., T.D. 3,629 ft.

Monongalia County, Clay district: South Penn Natural Gas Co. 3 Presley Tennant, 2 bbl., Big Injun sand, T.D. 2,007 ft.

Upshur County, Meade district: Cumberland & Allegheny Gas Co. 342 H. H. Golden, 166,800 cu. ft. gas, Fifth sand, T.D. 2,147 ft.

Wetzel County, Grant district: Pittsburgh & West Virginia Gas Co. 1 Mary Barr and C. B. Highland, 370,000 cu. ft. gas, from Gordon sand, Big Injun 1,998 ft., T.D. 2,866 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: United Fuel Gas Co. and Columbian Carbon Co. jointly 5147 W. A. Rogers 1,929,000 cu. ft. gas, Corniferous lime 5,124-5,224 ft., Oriskany 5,224-70 ft., shot 5,226-57 ft., T.D. 5,273 ft.

Washington district: Spartan Gas Co. 1 S. G. and C. W. Starcher, 2,728,000 cu. ft. gas, Corniferous lime 5,144 ft., Oriskany 2,263 ft., R.P. 1,265 ft., T.D. 5,314 ft.

ROCKY MOUNTAIN

Tensleep Production at Elk Basin Covers Large Area

DENVER, Colo. — The Elk Basin field, which straddles the Wyoming-Montana boundary, yielded evidence this week of far exceeding earlier estimates of its probable productive area in the Tensleep horizon when two key wells on the southwestern and southern flanks reached critical depths and gave indications of being good producers. The Tensleep discovery was made last December in Minnelusa Oil Corp. 1 E-T Henderson, NE NE NE 31-58n-99w, which produced 100 bbl. an hour at 4,547 ft., total depth. The next two wells completed were near the top of the anticline in the same general area in the southern part of the field and were good producers, but shed little light on the probable size of the new pool. Two weeks ago the Ohio Oil Co. 3 Mack OPC-7, ¾ mile to the west, came in for 1,064 bbl. in 24 hours at 4,854 ft. and proved that Tensleep production will extend much farther out than the shallow oil pool in the Frontier at around 1,400 ft.

Interest then turned to the Yale Oil Corp. 1 Watson, NE NE SE 36-58-100, more than ½ mile southwest of the Ohio well and 1¼ miles southwest of the discovery, which was considered a wildcat. It was running around 1,250 ft. lower than the crest of the structure, and it was given a 50-50 chance of being a producer. Then, below the top of the red beds, the formations began to flatten out, and it reached the top of the Embar at 5,340 ft., or approximately 250 ft. higher than it would have been found had the steep dips continued. A core was taken at 5,380-84 ft., the latter being the total depth, and 4 ft. of saturated Embar was recovered. At this depth the hole is being reamed to go through about 16 ft. of hard formation before reaching the top of the Tensleep. While the Embar has shown saturation in all of the Tensleep wells so far drilled, it is being cased off and will not be produced at this time.

The other key well is MacKinnie Oil & Drilling Co. 2 Northern Pacific, NE NW NW 5-57n-99w, a mile to the south and a little east of the Tensleep discovery. It found the top the Tensleep at 4,709 ft., which also is the total depth, after passing through saturation in the Embar. It is preparing to case off the Embar before drilling into the objective, and the indications are that it will make a good well. This operation also is far out beyond the limits of the shallow pool. It is an offset to the same company's 1 Northern Pacific, a gas discovery in the Dakota in January 1942 and like the Yale well, the beds began to flatten after passing through the Dakota series.

The third factor contributing to the week's optimistic developments is the fact that the Stanolind Oil & Gas Co. 1 Dengler, at the northern edge of the field and on the Montana side, which had been delayed by the steep dips and the hole deviating from the vertical, also found the beds flattening out with depth. The significance of these developments lies in the indications that the deeper beds are not cut up by the numerous faults which traverse the structure at the surface and in the younger formations, and the productive area may extend far out beyond the shallow pool and be found in blanket sands. There are now 15 active operations in the field.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 3 Tribal-229, SE SE SE 25-32n-6w, T.D. 3,101 ft., 7-in. 3,046 ft., Cut Bank sand 2,980-3,050 ft. with shale break at 3,007-46 ft., 300 ft. oil in hole, swabbed 10 bbl. in 24 hr., shot 10 qt., cleaning out.

Santa Rita Oil & Gas Co. 18 Tribal, C NW SW 10-35n-6w, T.D. 2,879 ft., 7-in. 2,854 ft., Sunburst (Lander) sand 2,850-76 ft., swabbed 900 bbl. first 24 hr., no water.

Texas Co. 2 fee, SE NE NE 31-32n-5w, T.D. 2,987 ft., 7-in. 2,937 ft., Cut Bank 2,935-83 ft., main pay 2,965-83 ft., swabbed 202 bbl. first 17 hr., shot 100 qt., swabbed 300 bbl. first 24 hr. after shot.

Kevin-Sunburst, Toole County: Texas Co. 4 Swayze, SW SE NE 34-36n-2w, T.D. 2,010 ft., Ellis-Madison 1,801-08 ft., 1,000 ft. oil in hole, pumped 135 bbl. in 24 hr.

FOR SALE

ONE MILLION POUNDS

3" Standard Black, Buttweld Pipe, a new, first quality grade; approx. 30% in lengths of 42" to 72"; approx. 70% in lengths of 6' to 13'.

Real "blue ribbon" material throughout, free of any rust or pit marks.

Also several thousand new, railing fittings, consisting of flanges, etc.

Available for immediate shipment.

Will sell all or any part.

JOS. GREENSPON'S SON PIPE CORP.

National Stock Yards, St. Clair Co., Illinois

Withholding TAX FORMS

Available for Immediate Delivery

● **Withholding Exemption Certificates** — Size 5"x8" ledger paper for convenience in handling and filing.

● **Tax Rate Table Charts**—For instant computation of amount to be withheld from employe. Charts show all wage earnings and cover daily, weekly, bi-weekly, semi-monthly and monthly payroll periods. Size 8½x11" on heavy cards.

50 Exemption Certificates and 1 set of 5 charts $1 prepaid

Additional Certificates —50c per 100. Extra Charts—15c per chart

FREE! Sample PAYROLL RECORD FORMS and time sheets for withholding tax will be sent on request.

MID-WEST PRINTING CO.

Box 809 — Phone 3-3176 — Tulsa 1, Okla.

HOW TO BRING YOUR LIST OF REFINERY AND NATURAL-GASOLINE PLANT PERSONNEL UP-TO-DATE

The Oil and Gas Journal's new Survey of Refineries and Natural-Gasoline Plants—just off the press—will give you the names and addresses of hundreds of NEW executives (from presidents down to foremen) in this field. In addition there are complete lists (by states) of both the active and shut-down plants, showing their input and output capacities, type of products manufactured. It's a buy at

$5 A COPY

Send your order and remittance to THE OIL AND GAS JOURNAL, Tulsa 1, Okla.

Texas Co. scores at Kevin-Sunburst. The Texas Co. has scored the second time in the past 2 weeks in its campaign for the development of new production around the outer edges of the Kevin-Sunburst field in northern Montana. This time it found production in the Madison lime on the north edge of the field in its 4 Swayze which pumped 135 bbl. in 24 hours from the Ellis-Madison, topped at 1,801 ft., without acidizing. It is just inside the boundary of the field designated as an oil and gas-producing field by the U. S. Geological Survey on its new map as of December 31, 1941, and in an area where a few Sunburst sand wells have been drilled, but no producers in the Madison. The lease was acquired a few months ago from the Ohio Oil Co., which has retired as an operator in that field. The Texas Co. has just put on record a number of leases to the west and north of the new producer, and has made a location for a west offset on the Holloway tract. The well is 9 miles northeast of same company's 1 Newman in 2-34-3w, on the west side of the field, a semi-wildcat which it completed 2 weeks ago for 155 bbl. initial.

Santa Rita producer in Lander pool. Santa Rita Oil & Gas Co completed its largest producer in Cut Bank since the company was taken over by the Carter Oil Co. in its 18 Tribal in C NW SW 10-35-6w, in the Lander pool on the west side of the field, which swabbed 824 bbl. the first 24 hours, 900 bbl. the second period, 924 bbl. the third period, and then flowed 610 bbl. per day. It is located 1 mile north and ¼ mile east of 1 Lander, the largest well ever finished in the field, which was completed in the Sunburst in 1936 for a maximum of 2,000 bbl. in 24 hours. Most of the wells in the field produce from the Cut Bank sand. No. 18 Tribal had saturated upper Sunburst (Lander) sand at 2,850-76 ft. Producers in the Sunburst run along a narrow trend from the southwest to the northeast, and a number of wells have been drilled trying to locate the boundary of the pool. Nearest producers are 13 Tribal, ¼ mile to the east, which made 284 bbl. from the Sunburst and Cut Bank combined, and 12 Lander, ¼ mile to the south, which found the Sunburst dry, but made 200 bbl. in 16 hours from the Cut Bank.

Fulcher Basin gas extended. — The Southern Union Production Co. 1 Couzens, a wildcat east of the Fulcher Basin gas producers in San Juan County, Northwest New Mexico, which gaged 1,250,000 cu. ft. at 1,890 ft., marks an extension of the field ¾ mile to the northeast and southeast of the nearest of six wells in the field.

NORTHWEST NEW MEXICO

Fulcher Basin, San Juan County: Southern Union Production Co. 1 Couzens, C SW 18-29n-11w, T.D. 1,890 ft., Picture Cliff sand 1,855-85 ft., 5½-in. 1,874 ft., 1,250,000 cu. ft. of gas.

NORTH LOUISIANA

Wildcat Plugged Back To Test Travis Peak Zone

SHREVEPORT, La.—In Columbia County, Arkansas, J. R. Hayden 1 Runyan, a wildcat 6 miles southwest of the Stephens field and northwest of the Magnolia pool, had set pipe at 3,410 ft. in the Travis Peak zone for a production test after a 15-ft. core at that depth showed saturation. The well was drilled to 7,667 ft. but encountered salt water and was plugged back.

The Arkansas Oil and Gas Commission, at El Dorado, granted special permission to the Carter Oil Co. to convert its 2 Phillips well in the Village pool of Columbia County into a salt-water disposal unit. The well, at approximately 8,200 ft., will be deepened 100 to 150 ft. in Smackover lime. Input will be limited to 500 bbl. a day for a 90-day test period.

ARKANSAS COMPLETIONS

Wildcat

Calhoun County: Placid Oil 8 Freeman-Smith, NW NE 8-15s-14w, dry, T.D. 4,699 ft.

Fields

Fouke, Miller County: Carter Oil 1 Offenhauser, SE NW SW 31-16s-26w, dry, T.D. 4,080 ft., Nacatoch 1,918 ft., Saratoga 2,425 ft., Tokio 3,105 ft., red beds 3,315 ft., Paluxy 3,480 ft.

Midway, Lafayette County: Southwood Oil 9 W. E. Hodnett, SE NE 18-15s-23w, flowed 55 bbl. through choke, Smackover 6,449 ft., T.D. 6,478 ft.

Stephens, Nevada County: R. H. Crow 1-C Guttry, SW SE SW 2-15s-20w, flowed 200 bbl., perf. 2,513-18 ft., T.D. 2,561 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Bossier Parish: Harry I. Morgan 1 Bolinger, NW NW 38-23n-11w, dry, T.D. 6,507 ft., slightly porous oolitic lime 6,108-28 ft., spotted stain.

Natchitoches Parish: O'Meara Bros. 1 Marble Saving Bank, 42-6n-5w, dry, T.D. 5,260 ft., Cook Mountain 1,637 ft., Wilcox 2,698 ft.

Sabine Parish: Seaport Oil Co. 2 Phares, NE NE NE 4-5n-12w, dry, T.D. 2,515 ft.

Fields

Caddo, Caddo Parish: E. D. Markham 1 Caddo Levy Board, S½ NE NE 8-20n-15w, pumped 15 bbl., perf. 1,430-90 ft., T.D. 2,174 ft.

Hosston, Caddo Parish: A. P. Gilbert 2 Gray, NW NW SE 34-22n-16w, pumped 15 bbl., T.D. 2,470 ft.

Bayou State Oil 2-A Owens, NE NE SW 21-22n-15w, pumped 10 bbl., T.D. 1,051 ft.

Pine Island, Caddo Parish: H. G. Lewis 1 Adger, SE NE SW 5-21n-14w, dry, T.D. 1,717 ft.

MISSISSIPPI

JACKSON, Miss. — California Co. 1 Natural Gasoline Co. of Louisiana, Inc., in the Sandy Creek plantation, Adams County, was at total depth of 5,794 ft. in sandy shale. It topped the Cane River at 3,800 ft. and the Wilcox at 4,120 ft. Operator ran an electrical survey from 5,794 ft. and was preparing to drill ahead. Humble Oil & Refining Co. 1 J. A. Hurst, 33-5n-8w, Greene County, set 16-in. casing at 37 ft.

MISSISSIPPI COMPLETIONS

Madison County: Carter Oil Co. 1 S. S. Wicker, SE SE 10-11n-3e, dry, T.D. 4,918 ft., Wilcox 1,283 ft., Midway 3,188 ft., Clayton 3,938 ft., Eutaw 4,886 ft., sand 4,918 ft.

Winston County: Hunt Oil 1 Miller Mill Co., NW SW 27-13n-11e, dry, T.D. 6,717 ft.

OKLAHOMA

Wildcats Open Hunton Lime And Cromwell Sand Pools

THE principal interest of Oklahoma operators was the unexpected and comparatively large Cromwell sand well about 3 miles east of Boley in Okfuskee County. The well is Mid-Co Oil Corp. 1 Turner, NE NW NE 24-12n-8e. Contracted to 4,000 ft. as a Hunton lime test, drilling was stopped at 3,504 ft. when saturation of the sand, topped at 3,496 ft. increased. When the plug was drilled, it headed and flowed an estimated 50 bbl. an hour. On a 5-hour test, it gaged a little over 700 bbl. and was shut in for pipe-line connections.

Pottawatomie County. — Hunton lime production was extended 1½ miles south of Brooksville at Stanolind Oil & Gas Co.'s 1 Perkins, SW SW SW 10-8n-3e. The well was drilled to the Wilcox at 5,474 ft., which was dry and then plugged back to 5,050 ft. The upper part of the Hunton was acidized through perforations at 4,855-75 ft. and the well flowed 30 bbl. of oil the first 30 minutes. On a 24-hour test, through 1-in. choke on tubing, it gaged 341 bbl. Successful development here would link the McComb pool, 2 miles to the south, with Brooksville into a large producing area. Three miles northeast of Perkins, Mid-Continent's 1 Caldwell had oil and gas in the Hunton at 4,536 ft.

OKLAHOMA COMPLETIONS

Wildcats

Beckham County: Northern Ordnance 1 Crawford, NW SE 25-9n-22w, dry, T.D. 6,010 ft., dolomite 3,080 ft., Cisco 3,160 ft.

Coal County: Stanolind-Amerada 1-B Cushing Royalty, NW NE SE 22-3n-9e, 44,000,000 cu. ft. gas, Cromwell sand 3,524-90 ft., T.D. 6,174 ft.

Cleveland County: Deep Rock et al 1 Harris, NE NW NE 11-10n-1w, flowed 315 bbl. in 8 hr., sandy dolomite 6,492-6,509 ft., T.D. 6,603 ft.

Comanche County: Texas Co. 1 Weaver, NW NW NE 14-3n-10w, dry, T.D. 2,550 ft.

Parker Drlg. 1 Spencer, NE NE SW 22-3n-10w, dry, T.D. 1,144 ft.

Pawnee County: Wilcoxson and Lunsford 1-A Mitchell, SE NW SE 27-20n-9e, pumped 2½ bbl., T.D. 511 ft.

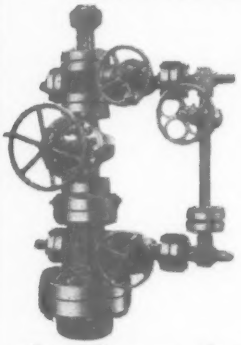
Keener Oil & Gas 1 Ross, SE SE NW 29-22n-7e, dry, T.D. 3,026 ft., Prue 2,350 ft., Skinner 2,465 ft., show oil.

Fields

Caddo, Carter County: Sun Oil 1 Fraser, SW SW 26-3s-1e, dry, T.D. 5,353 ft., P.B. 4,305 ft. and 2,687 ft., southwest offset to discovery.

(Continued on Page 90)

● BREWSTER *Pre-Tested* WELL ASSEMBLIES



Refer to our illustrated section in the COMPOSITE CATALOG

The performance of each assembly is proven by pre-testing with cold water at the prescribed pressure for 72 hours. Our engineers will be glad to show you records of typical installations, and develop an assembly to fit your exact needs.

The BREWSTER COMPANY, INC.

SHREVEPORT, LOUISIANA, U. S. A.

EXPORT:
Acme Well Supply Co., 19 Rector St., N.Y.C.

ARMY E NAVY

Brewster proudly flies the Army-Navy "E" Flag, awarded for high achievement in war production.

EQUAL DISTRIBUTION OF PRESSURE

UNIBOLT Couplings with their three interlocking shelves, or 3-point suspension, employ a proven principle and thus assure equal distribution of pressure on the seal ring.

★

THORNHILL-CRAVER COMPANY
HOUSTON

UNIBOLT
(TRADE MARK REGISTERED U. S. PATENT OFFICE)
THE ONE BOLT COUPLING

William M. Barret, Inc.

Consulting Geophysicists

Specializing in Magnetic Surveys

Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.

GIDDENS-LANE BUILDING
SHREVEPORT, LA.

Among the Drilling Contractors

Gardner Brothers, Dallas, Tex., are starting on a 7,500-ft. wildcat test for Gulf Oil Corp., on the Carrie S. Dean ranch, Section 30, Block 1, John Poitevent Survey, eastern Dawson County, Texas.

Loffland Brothers, Tulsa, have contract for 11,000-ft. wildcat to test Ellenburger for Sinclair Prairie Oil Co., in Section 11, Block B-5, Public School Land, 8 miles south of the new Ellenburger discovery of Amon G. Carter which flowed 6,790 bbl. per day on recent potential test.

Carl B. King, Dallas, Tex., has contract to drill 7,200-ft. hole for Standard Oil Co. of Texas at 1 T. F. Keasler, SW NW Section 10, Block 72, Public School Land, 4 miles northeast of Toyah, in Reeves County, Texas.

Harry L. Edwards Drilling Co., Houston, Tex., was setting pipe at about 5,240 ft. last week for completion of 5 Chamrad, in the North La Ward field, Jackson County, Texas, for Cities Service Oil Co. For the same company the Edwards concern is conducting tests at 1 Witcher, in the Alief area of Harris County. This well was drilled to total depth of 8,711 ft. and plugged back to 7,931 ft. Another Edwards crew is testing Pan American Production Co. 24 Laws Realty, in the Charenton field of St. Mary Parish, Louisiana.

Falcon-Seaboard Drilling Co., Houston, Tex., has set surface pipe for 1 Rycade, in the Roanoke field, Jefferson Davis Parish, Louisiana, a joint operation of Falcon-Seaboard. Charles G. Dunwoody, and Barnsdall Oil Co. This contractor is nearing completion depth at 2 Schexnayder Community for Shell Oil Co., Inc., in La Pice field, St. James Parish. It was at 4,200 ft. at 1 Muslow, a Smackover lime test in the Homer field, Claiborne Parish.

Parker Drilling Co., Houston, Tex., is moving in for a deep test at 1 J. A. Hurst, in 33-5n-8w, Greene County, Mississippi, to be drilled for Humble Oil & Refining Co.

Housh & Thompson Drilling Co., Houston, Tex., is rigging up at 1 J. R. Nesbitt, a wildcat test for O. W Killam Co., 1½ miles northwest of Fulshear, in Fort Bend County, Texas Cockfield production is the objective. This contractor recently completed 1 Weiss-Hudson for Northern Ordnance Co., Inc., 5 miles southeast of Batson, in Hardin County, a dry hole at 8,479 ft.

Morris-Hamilton Drilling Co., Houston, Tex., is rigging up at G-9 M. Gray for Union Oil Co. of California in the Vinton field, Calcasieu Parish, Louisiana. The same contractor completed G-8 M. Gray in that field for Union Oil last week. Morris-Hamilton was drilling below 4,600 ft. at Phillips Petroleum Co. 2 Beaumont in the new Bear field of Beauregard Parish.

Muskegon Development Co. has contract to drill Gulf Refining Co. 1 Friebe-Wieland, C N½ NW SW 35-15n-4e, Bay County, Michigan.

Lupher Drilling Co. has rotary contract on McClanahan Oil Co. 1 State-Apps, C S½ NW NE 26-22n-6w, Missaukee County, Michigan. McClanahan will do the cable-tool drilling.

Bridger Basin Oil Co. has contract to drill the Socony-Vacuum Oil Co., Inc., 1 Thomas De Leo, NE NE SE 8-2s-16w, Van Buren County, Michigan.

Helmerich & Payne, Tulsa contractors, have contract on a proposed 5,100-ft. test to be drilled by Neville G. Penrose, Inc., of Fort Worth, Tex., (formerly Mascho Oil Co. of Midland, Tex.). The test, for which rotary is being rigged up, is the 1 Phillips-State, in C SE SE 3-16s-33e, Lea County, New Mexico, 6 miles northwest of the Vacuum pool.

Wynn Crosby Drilling Co. and **Kirby Petroleum Co.** have drilled their 1 Jackson, Roberts Survey, Chambers County, Texas, to 9,500 ft., and had landed casing around 8,200 ft. to test a gas and distillate sand topped at 8,090 ft.

H. & H. Drilling Co. has the contract on Ptak Petroleum Co. et al 1 Owens, in SW SE NE 30-14n-1w, southeast of Arcadia in northeastern

Oklahoma County, Oklahoma. Contract is for 6,000 ft. or the Wilcox sand.

Markley-Bankley Drilling Co. has the contract to drill Moran Oil Co. 1 Meeker, in SW 6-1n-1e, Rapides Parish, Louisiana. This will be a Wilcox zone test.

J. W. Lang has been awarded contract to drill Mammoth Producing Corp. 1 Dick S. Bosch, SW SE NW 1-4n-15w, Allegan County, Michigan.

Ervin Major will drill a well on his own account in Bay County, Michigan. The well is the 1 Alfred H. and Pauline M. Sivier, in C SW NE 1-18n-3e.

Scott & Marrs will drill the American Producing Co. 1 Bentley-Christensen, in SE SE NE 28-11n-7w, Montcalm County, Michigan.

Louis Rose, contractor, has contract to drill Peter J. Bolger 1 August Carlson, C S½ SE SE 26-19n-10w, Osceola County, Michigan.

Leonard Drilling Co. has contract to drill the 1 Grace Sanford for Rowmor Corp., Arthur Cook and Arthur Williams, in C S½ SE NE 31-19n-9w, Osceola County, Michigan.

Ralph Perry will drill the Howard E. Fowler 1 Edward and Jennie Baron, in NW NE SW 31-5n-14w, Ottawa County, Michigan.

Stewart Godfrey has contract for the Socony-Vacuum Oil Co., Inc., 3 Varnum, Marrs & Hills (Comm.), in NE SE SW 24-1s-16w, Van Buren County, Michigan.

Ashby Drilling Co. will drill the Midwest Refineries, Inc., 1 George Wait, in C S½ SW NE 29-21n-11w, Van Buren County, Michigan.

SUPER-UNIVERSAL MUD GUN

Mixes and agitates the mud the right way. Try one.

PATTERSON BALLAGH CORPORATION

Los Angeles Houston New York City

Spacing Order Relaxed In Cut Bank District

DENVER, Colo. — The Petroleum Administration for War has granted an exception to the spacing order in the Cut Bank field in Montana, and one well to 20 acres now is authorized. The ruling was made primarily for the benefit of independent producers who have mostly small tracts and were handicapped in drilling additional wells by the 40-acre pattern.

The modified spacing order is expected to open the way for the drilling of around 40 wells by the independents this year. The majors have sufficient undrilled 40-acre tracts to employ all the rigs and crews available.

East Texas Operators Warned to Furnish Report

AUSTIN, Tex.—Operators in the East Texas field were warned this week that unless the detailed well-status report, required by Railroad Commission Special Order 6-4727 is filed by July 1, a pipe-line severance will be issued against the tardy leases.

The special order was issued April 27, requesting detailed operating data on East Texas producing wells, including the amount of water produced with allowable pressures and numerous other pertinent data.

Oil-Conservation Bill Abandoned in Illinois

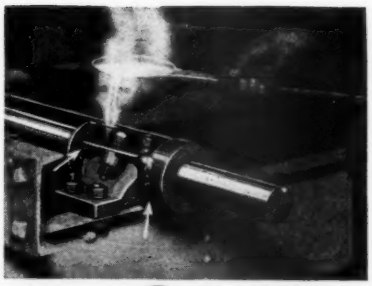
SPRINGFIELD, Ill.—Efforts to pass the administration's oil-conservation bill at the current session of the Illinois Legislature have been abandoned. Sponsors of the legislation last week discontinued their fight to win approval and said they would permit the bill "to die on the calendar."

In a test vote 2 weeks ago, the measure lacked two votes of passing the Senate. Since that time Sen. George C. Armstrong of Lawrenceville, one of the sponsors, withdrew his support.

Opponents said the bill gave excessive powers to a proposed conservation commission and was inimical to the interests of small operators.

Sour Gas Allowable Set For West Panhandle Field

Allowable production of sour natural gas from the West Panhandle field in July last week was set by the Railroad Commission at 627,731,000 cu. ft. daily.



The *Safe* Way to Pour Babbitt!

Use Babbitrite, the proven, time-tested babbitt retainer instead of make-shift materials. Eliminate costly time-consuming blow-outs, the danger of injury from hot molten metal. Babbitrite is moisture-proof, is not affected by heat and will not harden. Comes ready-for-use, requires no mixing and can be used over 100 times.

Write for liberal sample.

Babbitrite — AS NECESSARY AS THE LADLE

BABBITT RETAINER

PRODUCTS MFG. CO.

5 9 N. Milwaukee St. • MILWAUKEE 2, WIS.

WORTH WAITING FOR BUT NO WAITING IS NECESSARY

'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining industries for years—is immediately available through more than 100 distributors in the U.S.A. Any priority rating will do.

Your nearest supply house field store probably has 'BESTOLIFE in stock for immediate delivery. Use 'BESTOLIFE—its BETTER!

MANUFACTURED BY

I. H. GRANCELL

1601 EAST NADEAU STREET

LOS ANGELES, CALIFORNIA

PERSONALS

E. R. PARR

Superintendent for Caribbean Accepts PAW Foreign Duty

E. R. PARR, recently retired as general superintendent of drilling for Caribbean Petroleum Co., one of the Shell operating subsidiaries in Venezuela, has joined the Foreign Division, Petroleum Administration for War. He reported at PAW's Washington office this week for assignment.

Mr. Parr's retirement terminated a career of 21 years spent in South American petroleum operations, 18 of which were in Venezuela preceded by a 3-year tour in Colombia.

He rose from the rank of driller to the general superintendency of Shell's Venezuelan drilling operations in 17 years of association with that organization.

He was drilling in Texas in 1919 when offered a job in western Canada by Imperial Oil, Ltd. Three years were spent with the Imperial exploration division in Canada when Mr. Parr applied for foreign service and was sent to Colombia with Tropical Oil Co. When his contract in Colombia expired he moved to Venezuela and first accepted employment as a driller for Standard Oil Co. of Venezuela. Seven months later, he transferred to Caribbean as a driller and was promoted to tool pusher in 1928.

He was promoted to general superintendent of drilling in 1935 and continued in that capacity until the middle of this year when he retired under the Shell's retirement plan which provides time-and-a-half credit for foreign service.

Neal B. Hinkle, warehouse foreman for Humble Oil & Refining Co. in Corpus Christi, Tex., until his induction into the Army in May 1942, has been advanced from staff sergeant to technical sergeant at Camp Stoneham, California, where he is stationed.

C. M. Osborn, employed in the refinery of Eastern States Petroleum Co., Inc., Houston, Tex., until he entered war service, has been commissioned a lieutenant at the Clovis, N. M., air field, where he is a Liberator pilot.

Elmer Mixon, tour engineer at the Humble station of Texas Pipe Line Co.'s South Texas division, recently underwent an appendectomy.

Capt. Isadore Levine, formerly a subsurface draftsman for Shell Oil Co., Inc., and graduate of Texas A. and M. College, is attending the new division officers' course at Fort Sill, Oklahoma

Lt. William N. Fitzhugh, of Galveston, Tex., was honor guest at a "welcome home" program last Thursday at the Texas City plant of Pan American Refining Corp., attended by the 240 employes. Lieutenant Fitzhugh, who was copilot of a plane in the Tokio raid last year, was employed in the mechanical department until he enlisted in the Army Air Corps in November 1940. The program was conducted by **P. J. Sweeney,** plant manager.

Kenneth L. Chism, employed in the process department of Humble Oil & Refining Co.'s refinery at Ingleside, Tex., until he became an aviation cadet last September, is to receive his wings at the Pampa, Tex., air field.

Alfred T. Townley has been named manager of the annuities and benefits department of the Standard Oil Co. of New Jersey, succeeding the late W. G. Gillson. Mr. Townley started with the company as an office boy in the treasurer's department in 1920 and since 1933 has been in charge of checking, analyzing and preparing all retirement, special sickness and death cases for consideration by the company's annuities and benefits committee.

Lt. A. S. (Spot) Robertson, manager of the Roger Lacy refinery, Kilgore, Tex., until he joined the Navy, is now stationed on the West Coast after a period of indoctrination at bases in the eastern part of the country.

First Lt. Richard Brewer, formerly seismologist in the exploration department of Shell Oil Co., Inc., Houston, Tex., has received a temporary assignment to the R.A.F. School of Applied Tactics, Orlando, Fla., following almost a year of oversea service.

H. J. Duncan, district engineer of the U. S. Geological Survey at Casper, Wyo., has been transferred to Washington and appointed chief of the oil and gas leasing division to succeed **H. B. Soyster,** who recently was made chief of the conservation branch. **E. A. Hanson,** of the Roswell office, succeeds Mr. Duncan at Casper. **J. R. Schwabrow,** of Thermopolis, Wyo., goes to Casper as deputy supervisor, and is succeeded at Thermopolis by **J. H. Hassheider,** of the Great Falls, Mont., office. **R. C. Patterson,** of Los Angeles, Calif., was made supervisor at Roswell. **R. E. Spratt,** district engineer at Denver, Colo., has been transferred to Washington, and is succeeded by **G. G. Frazier,** of the Casper office.

M. D. Dennis, who has been located at the Texas Co. refinery at Sunburst, Mont., for 15 years, has been made senior cost accountant in the New York statistical office of the company.

Lt. James A. Webb, petroleum engineer of Houston, Tex., and at the time of his entrance into war service superintendent for Lucey Petroleum Co. at Mount Pleasant, Tex., has written to **Carl R. Haas,** Houston oil man, that he is stationed at the same base in North Africa with three other Houston oil men: **Capt. Temple Hargrove,** independent operator; **Lt. Col. M. C. McGehee,** head of McGehee Oil

Co., and **Lt. Roy Schooler,** former district clerk in the production department of the southern district for Phillips Petroleum Co. All are assigned to posts which utilize their technical knowledge of oil.

S. M. Benavides, for 8 years inspector in the Oil and Gas Division of the Texas Railroad Commission, has joined Humble Oil & Refining Co. as a junior clerk in the production department in Corpus Christi.

Harold S. King, employed as clerk in the material and accounting department of Gulf Oil Corp., Houston, Tex., when he entered the Army last March, has already accumulated three medals at Camp Joseph T. Robinson, Arkansas, where he is stationed. They are for high grades in sharpshooting, machine gun, and bayonet work. Mr. King was a star basketball player.

Robert P. Reid, geologist with Phillips Petroleum Co., at Bartlesville, Okla., is being transferred to Denver, Colo. He formerly was with Indian Territory Illuminating Oil Co. and Cities Service Oil Co.

Ernest L. Hauser, former employe of Humble Oil & Refining Co., Houston, Tex., has been commissioned a second lieutenant in the Army. He is somewhere in the southwestern Pacific.

Rex G. Baker, an attorney for Humble Oil & Refining Co., Houston, Tex., has been notified that his son, **First Lt. Robert H. Baker,** has been decorated with the Air Medal "in recognition of his courageous and fearless service." For the last 8 months he has been in New Guinea and on Guadalcanal.

Jack Wallace Hickman, former employe of Mid-Continent Petroleum Corp., Tulsa, was recently promoted to the rank of colonel in the Army Air Corps, somewhere overseas. He is a base commander.

Vaughn W. Russom, geologist for Sinclair Prairie Oil Co., has been transferred from Oklahoma to Lander, Wyo.

B. B. Howard, general manager, marine department, Standard Oil Co. of New Jersey; **Willard F. Jones,** general manager, marine department, Gulf Oil Corp., and **Charles H. Kunze,** manager, marine transportation department, Socony-Vacuum Oil Co., Inc., are members of the committee representing the Maritime Division of the Greater New York Fund for 1943.

George Tyler, secretary of California Natural Gasoline Association, has announced the newly added Appendix 9 Field Method for Determining the Air Content of Wet Gases Under Vacuum for Bulletin TS-351, and Procedure for the Charcoal Test for the Determination of the Gasoline Content of Natural Gas, are now available at the association's office in Los Angeles.

Frank B. Murta, independent oil operator and drilling contractor of Tulsa, was in Fort Smith, Ark., this week on the occasion of the sixty-first wedding anniversary of his parents, Mr. and Mrs. C. J. Murta, on June 28.

J. J. Harrity, Jr., who worked for Gulf Oil Corp., Houston, Tex., as a laboratory helper in the chemical division, production department, is now with the Marines in the South Pacific area as a pharmacist's mate, and has been in several battles.

Lt. William W. Saunders, formerly with Cities Service Gas Co., Bartlesville, Okla., is now a German prisoner of war, according to word received by his mother. He was reported missing on April 5.

Archie Kautz, geologist and scout for Cities Service Oil Co. in the Panhandle region of Texas, has been transferred to the home office at Bartlesville, Okla. He had been in Amarillo since 1929, and has served as chairman of the Panhandle Oil Scouts and of the Panhandle Geological Society. He will be replaced in Amarillo by **E. W. Sisney,** who is being transferred from Oklahoma City, Okla.

W. B. McCluer, refinery superintendent of Kendall Refining Co., Bradford, Pa., has resigned, effective July 1, and after a month's vacation will become associated with Rohm & Haas Co., Philadelphia, Pa., manufacturers of heavy chemicals and plastics. **Howard V. Smith** has been named to succeed Mr. McCluer with Kendall. After graduating from University of Kansas as a chemical engineer, Mr. Smith was for 14 years with Skelly Oil Co., the last 11 years as assistant refinery superintendent at El Dorado, Kans. In 1918 he went east to head the technical department of Barber Asphalt Co., and more recently did synthetic-rubber work for Lummus Co.

D. A. (Don) Miller has returned to Oklahoma City, Okla., as assistant to **Jim Stephens,** division production superintendent for Phillips Petroleum Co., succeeding **Floyd Stephenson,** who has been called to the Navy as a lieutenant. Mr. Miller moved to Ponca City, Okla., early this year as superintendent in the northern area.

Dr. Ionel I. Gardescu, petroleum engineer for Texas Co., Houston, Tex., had an exhibit at the Texaco Country Fair, held recently in End o' Main Hall, Houston, which stirred interested comment. He showed cocozell squashes, such as he used to raise in Rumania.

F. H. DUNN

Frank H. Dunn has been elected president of H. F. Wilcox Oil & Gas Co., Tulsa, succeeding **Homer F. Wilcox,** who last week resigned that office. **Melvin P. Appleby** has assumed the office of executive vice president, formerly held by Mr. Dunn, in addition to continuing his present duties as treasurer. **Edward J. O'Herron,** Charlotte, N. C., was elected chairman of the board. Mr. Dunn has been with the Wilcox company since 1919, and has served in every branch of the company's activities from pipe liner to executive vice president.

G. J. Neuner, of Kansas City, Mo., vice president of Panhandle Eastern Pipe Line Co., has announced his resignation, to become effective as soon as it is convenient to the management. He has been directly connected with Panhandle Eastern for the past 12 years, first as counsel in charge of all legal activities, later as vice president and counsel, and since August 1, 1938, as vice president in charge of operations. Mr. Neuner first became connected with the oil and gas industry in 1916, when he joined Cities Service Co. in Bartlesville, Okla. In 1926 he became associated with Barnsdall Oil Co. in Tulsa as assistant general counsel, a post he held for 5 years until joining Panhandle Eastern.

Frank Blanchard, for several years geologist in the Texas Panhandle for Skelly Oil Co., has resigned and has gone to Jackson, Miss., as geologist there for Sinclair Prairie Oil Co.

J. B. Pate, assistant superintendent of the southern division pipe lines of Union Oil Co., is acting superintendent during the absence of **J. H. Robinson** who has been appointed acting superintendent of the northern division pipe line while **R. V. Rosborough** is assigned to special duty at the headquarters of the company in Los Angeles, Calif.

Charles H. Pierce and **Marvin M. Rosson** of Shell Oil Co., Inc., have been transferred to Shell Chemical Co. for service at the company's Torrance, Calif., butadiene unit.

Charles Goldsmith has resigned from the staff of Canadian Oil Companies, Ltd., at Petrolia, Ont., and will take a course at Midland, Michigan, prior to entering the employ of Dow Chemical Co. which will open a Canadian plant near Corunna, Ont.

Market Developments

East Coast

NEW YORK.—Further improvement in the eastern oil-supply situation was made during the past week but it served merely to rescue the situation from the critical stage and does not imply that consideration should yet be given to lifting restrictions. Recently imposed restrictions brought gasoline consumption within limits of supply for the first time since the ban on pleasure driving was revoked and, as a result, some improvement in the stock position has occurred.

The fact that restrictions must be continued is evident from data released from Washington which show that the minimum essential requirements for District 1 in the third quarter amount to 567,000 bbl. per day, while the prospective supply totals only 469,000 bbl. or 83 per cent of minimum requirements. This source also revealed an excess consumption of 30,000 bbl. per day in District 2 showing that that area is not in position to provide much relief for District 1.

Concentration on gasoline shipments into District 1 in recent weeks has adversely affected the fuel-oil position so that no significant improvement in stocks has been possible. Since stocks must be accumulated if only as a measure of assurance against local shortages, emphasis on fuel-oil accumulation is essential.

Mid-Continent

PEAK seasonal calls from agricultural districts in the Middle West continued this week to tax stocks and shipping facilities of Mid-Continent refineries. Still, according to some manufacturers, the current concern over ability of the Middle West manufacturers to supply demand for motor fuel and other petroleum products is not justified on the sole basis of recently discovered statistics.

Stocks of finished and unfinished gasoline in the hands of Indiana, Illinois, Kentucky, Oklahoma, Kansas and Missouri refiners currently total 23,352,000 bbl., approximately 2,000,000 bbl. less than held in inventory at the same time a year ago. However, motor-fuel stocks in the same six states were built up to 33,550,000 bbl. in the middle of March 1942, previous to severe restrictions on the volume of crude processed and the percentage yields of gasoline. In the middle of March this year the same refining districts had motor-fuel stocks of only 28,155,000 bbl., more than 5,000,000 bbl. less than at the start of the heavy consuming season last year.

Consequently, concern over the current ability of Mid-Continent refineries to meet existing military and essential civilian demand appears to be more specifically related to the long-term view. Withdrawal of crude from storage in order to meet existing rates of runs to stills is the basic cause for concern and not necessarily the present position of motor-fuel stocks.

Gulf Coast

HOUSTON, Tex. — Search for gasoline to meet war and civilian demand continued this week. Major refiners were trying to buy from minors. Minors were trying to buy from majors. Any blending material that could be used in producing a motor fuel found ready sale. One large refiner was reported to have made a systematic canvass of sources for naphtha and to have taken all offerings, with no quibbling over price.

A somewhat anomalous condition was disclosed in the fact that, notwithstanding a critical gasoline shortage, there is around 1,000,000 bbl. of 91-octane material in Gulf Coast tanks. Probably three-quarters of it is in the Corpus Christi area. The situation loses its mystery, however, when it is explained that all of this accumulation is earmarked for the Army or Navy and is simply waiting for shipping instruction. Gasoline stocks of all grades held by independent refiners of the Gulf Coast territory on June 15 totaled 2,298,084 bbl. This included the earmarked aviation fuel referred to. No further additions to stocks apparently were being made.

Shrinkage in stocks of Bunker C fuel-oil was causing concern. Stocks totaling 83,000 bbl. in the hands of Gulf Coast independent refiners on June 15 compare with normal inventories of 450,000 bbl. Lease-lend requirements, the U. S. Government, and industrial plants of New England make heavy drafts upon this material produced in the Gulf Coast region. Some refiners said the clamor for kerosene seemed to have subsided a little, but all reports pointed to an extremely tight market.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended June 19, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	157	2,330	575	933
Ind., Ill., Ky.	711	17,203	3,181	4,609
Okla., Kan., Mo.	356	6,329	1,569	1,773
Censored area*	1,832	31,638	11,991	13,944
Rockies	106	1,846	603	339
California	743	20,460	49,536	11,960
Total 6-19-43	3,905	79,806	67,455	33,558
Total 6-12-43	3,799	81,114	67,652	32,555
Total 6-20-42	3,450	89,693	78,934	31,477

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
June 19, 1943	243,516,000
June 12, 1943	244,720,000
June 20, 1942	252,748,000

*Excludes unrefinable stocks in California.

Pacific Coast

LOS ANGELES, Calif.—The first synthetic rubber produced in California started rolling out of Shell Oil Co., Inc.'s butadiene plant a few days ago and since Dow Chemical Co. had been producing styrene for several weeks previously no time was lost in processing the raw butadiene. Southern California Gas Co.'s butadiene plant has been on partial operation for the past 2 weeks and will be in full operation within another week or 10 days. Some last-minute minor changes are being made but the first batch of butadiene from this plant moved 20 miles to the Shell plant via pipe line about 10 days ago. When this plant and Shell's new butadiene plant are in full operation along with Standard's butadiene unit scheduled for completion in September the synthetic-rubber industry will be in full swing.

Shell's unit was finished 6 weeks ahead of schedule. It is an excellent installation of major caliber and covers approximately 250 acres including the butadiene unit, the styrene plant and the tire-plant installation. It is one of the largest plants of any kind in California although not as complex as a few of the refineries. Deliveries of charging stock for Shell and Southern California Gas Co. have started and when this reaches the peak it will represent approximately 25,000 bbl. per day in addition to that required for Standard's unit. This will make an appreciable dent in stocks of gasoline and naphtha distillates. There were no important price changes during the current week and fuel oil is holding firm with very little moving due to low bids.

Refinery Prices

(Prices as of June 29)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C§
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	†1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. §Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
900	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—	
150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.66	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nex.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.87

North Central Texas

(Continued from Page 75)

T.D. 1,170 ft.

Bridwell Oil 19 John Saner, Lot 14, Thornberry subd., dry, T.D. 1,325 ft.

Wichita County: Ernest Prod. 1-A F. P. Warren, W. J. Smith Sur., A-678, dry, T.D. 1,477 ft.

Wilbarger County: C. B. Christie 2 J. W. McCrary est., Sec. 64, Blk. 14, H.&T.C. R.R. Sur., pump 68 bbl., sand pay 1,486 ft., T.D. 1,496 ft.

Williamson, Young County: E. J. Boeske, Jr., 3 E. G. Williamson, 1,372 ft. from N, 1,310 ft. from E, Sec. 601, T.E.&L. Sur., I.P. 95 bbl., Mississippi lime pay 4,986 ft., acid 1,000 gal., T.D. 4,994 ft.

Young County: Thomas D. Humphrey 2 E. Steele, 1,650 ft. from S, 2,310 ft. from W, B.S.&F. Sur., dry, T.D. 2,260 ft.

WEST CENTRAL TEXAS

ABILENE, Tex. — Prospects for opening a new Mississippi lime pool in Palo Pinto County, just south of the Young County line, were brightened when Rathke Oil Co. 1 Stovall, J. O. Rohns Survey, tested 1 bbl. oil per hour from 4,786-95 ft., and was preparing to acidize. The well is in an area in which the Caddo lime horizons have been tested with favorable shows, west of the Pickwick pool.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Coleman County: Sohio Prod. 1 J. M. Weathered, 660 ft. from S'ly N, 810 ft. from E'ly E, Sec. 69, Blk. 2, G.H.&H. Sur., elev. 1,814 ft., Morris sand 2,797 ft., Gray sand 3,325 ft., dry, T.D. 3,348 ft.

Shackelford County: George Kidd 1 J. B. Matthews, NW NE NW Sec. 19, Blind Asylum Land, dry, T.D. 743 ft.

Stephens County: Ben F. Read, trustee, 1 W. A. Corbett, NW NW Sec. 1092, T.E.&L. Sur., elev. 1,217 ft., Caddo 3,390 ft., Marble Falls 3,900 ft., flow 840 bbl., lime pay perf. 3,938-60 ft., T.D. 4,242 ft. Discovery.

Fields

Avoca, Jones County: M. J. Delaney 1 Jones & Stasney, 330 ft. from W, 990 ft. from N, Sec. 191, B.B.B.&C.R.R. Sur., elev. 1,516 ft., Palo Pinto lime 3,253 ft., I.P. 56 bbl., 28 per cent water, lime pay 3,253 ft., T.D. 3,255 ft.

Brown County: Central Texas Gas 6 H. J. Perry, 1,100 ft. from N, 330 ft. from W, Blk. 1, Sec. 1, E.T.R.R. Sur., dry, T.D. 952 ft.

Shackelford County: Merrick & Merrick 3 Pittman & Reynolds, Sec. 541, T.E.&L. Sur., dry, T.D. 752 ft.

South Noodle, Jones County: Humble Oil & Ref. 2-C D. O. Huddleston, 523 ft. from S, 467 ft. from E of NE¼ Sec. 38, Blk. 18, T.&P.R.R. Sur., elev. 1,871 ft., flow 70 bbl., pay sand 2,441 ft., T.D. 2,445 ft.

Strand, Jones County: S. B. Roberts and Fain & McGaha 2 Hazel Strand, 510 ft. from S and E, NE SW Sec. 5, Blk. 5, H.&T.C.R.R. Sur., Palo Pinto 3,481 ft., dry, T.D. 3,502 ft.

Illinois Fields

(Continued from Page 72)

27-2n-12w, pumped 30 bbl., Biehl sand 1,370-92 ft., shot, T.D. 1,394 ft

South Maunee, White County: Sinclair-Wyoming 1 F. S. Ackerman, SE SW SW 13-6s-10e, old well P.B. from 3,007 ft. to 2,587 ft., pumped 12 bbl. oil, 12 bbl. water, shot at 2,575-86 ft.

Walpole, Hamilton County: Texas 1 F. Johnson, NW NW NE 27-6s-6e, pumped 169 bbl., Aux Vases sand 3,088-92 ft., shot, T.D. 3,113 ft.

West Inman, Gallatin Count: Ashland 2 Rister, SW NW NE 15-8s-9e, dry at 2,989 ft., Glen Dean 2,295 ft., Barlow 2,496 ft., Cypress 2,536 ft., upper Renault 2,708 ft., lower Renault 2,786 ft., Aux Vases 2,797 ft., Ste. Genevieve 2,828 ft., McClosky 2,879 ft., St. Louis 2,985 ft.

West Inman, Gallatin County: Gulf 5 Bahl, SW SW SW 15-8s-9e, 91 bbl. oil, 5 bbl. water from Tar Springs and Cypress sands, Tar Springs top 2,179 ft., Cypress 2,491-2,510 ft., T.D. 2,515 ft.

Woodlawn, Jefferson County: British-American 2 Chesneck, SW SW SW 26-2s-1e, pumped 19 bbl. oil, 8 bbl. water, Benoist top 1,997 ft., T.D. 2,009 ft.

Eastern Kentucky

(Continued from Page 81)

Cabin Branch, shale, 169,000 cu. ft. gas at 2,999 ft.

Warfield Gas 5191 W. J. Parks, Ash Log-Wolf Creek, Big lime, 852,000 cu. ft. gas at 1,786 ft.

Virginian Gas & Oil V-1321 A. L. Moore 2, Wolf Creek, 12 bbl. oil at 1,688 ft.

Virginian Gas & Oil V-1325 A. L. Moore, Pigeon Roose, Maxon, 133,000 cu. ft. gas at 1,688 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Carter Oil Co. opened a pool 8 miles south of Henderson in its 1 C. E. Cottingham, which swabbed 167 bbl. in 17½ hours from Waltersburg sand at 1,797-1,806 ft. Pumping unit was being installed at the close of the week. Total depth is 1,806 ft.

WESTERN KENTUCKY COMPLETIONS

Henderson County: Sinclair Prairie 1 Hatehitt, 7 mi. SE of Henderson, dry at 2,419 ft., McClosky lime 2,176-80 ft.

Sun Oil 1 F. C. Hall, 1½ mi. E of Henderson, dry at 2,530 ft., lower Menard 1,630 ft., Glen Dean 1,850 ft., Barlow 2,100 ft., Renault 2,291 ft., Ste. Genevieve 2,530 ft.

INDIANA

EVANSVILLE, Ind.—One oil well and three dry holes comprised Indiana's completion crop in the week in review. S. C. Yingling started a wildcat in 1 Eckhoff, SE NW SE 21-6s-12w, in Posey County; W. F. Lacey started 1 Feckas, SW SW NW 11-7s-10w, Vanderburg County, and Ohio Oil Co. 1 Shirley Realty Co., 385 ft. from north and 330 ft. from east lines SE NW 22-9n-9w, Sullivan County.

INDIANA COMPLETIONS

Gibson County: Continental 59 Amanta Maier, NE NE NE 14-3s-14w, pumped 124 bbl., Cypress sand 2,480-90 ft., T.D. 2,501 ft.

Posey County: Cherry & Kidd 4 Walgrove, SW SE SW 11-4s-14w, dry at 2,690 ft., Menard 2,077 ft., lower Menard 2,140 ft., Glen Dean 2,361 ft., Golconda 2,450 ft., Barlow 2,581 ft., Cypress 2,624-50 ft.

Bristol Hackbush 1 H. H. Schweikhand, NW NE SW 23-5s-12w, dry at 1,250 ft.

Vanderburg County: Illind 1 Marrenholz, SE SW SW 29-6s-11w, dry at 1,906 ft., penetrated Waltersburg and Tar Springs sands.

California Fields

(Continued from Page 71)

11w, pumped 248 bbl., 26.8-gravity, 1 per cent cut, T.D. 5,000 ft., perf. 4,117-5,000 ft., completed in lower Bolsa zone of Pliocene age.

Standard 46-A Huntington, 3-6s-11w, pumped 117 bbl., 14.1-gravity, 18 per cent cut, T.D. 3,490 ft., P.B. 3,420 ft., perf. 3,026-3,413 ft., completed in lower Bolsa zone of Pliocene age.

Montebello, Los Angeles County: Standard 99 Baldwin, 1-2s-12w, pumped 125 bbl. 18.7-gravity, 6 per cent cut, T.D. 2,867 ft., perf. 2,607-2,867 ft., completed in Baldwin zone of Pliocene age.

Torrance, Los Angeles County: Lebow-McNee 2 Dominguez estate, 5-4s-14w, pumped 60 bbl., 20.9-gravity, 0.8 per cent cut, T.D. 3,670 ft., perf. 3,308-3,648 ft., completed in Ranger zone of Pliocene age.

Oklahoma Fields

(Continued from Page 83)

Tide Water 1 Fraser, NW SW 26-3s-1e, dry, T.D. 5,592 ft., west offset.

Cumberland, Marshall County: Pure Oil Co. 7 Little-101, SW NE 28-5s-7e, flowed 640 bbl. in 4 hr., 2,000,000 cu. ft. gas, potential 3,648 bbl. daily, Oil Creek sand 6,277-6,325 ft., T.D.

Empire, Stephens County: W. J. McAlester 1 Parrott-Trout, NW NE SW 1-2s-8w, dry, T.D. 1,477 ft.

Garber, Noble County: Sinclair Prairie 26 Campbell, NW SW NE 30-22n-3w, pumped 16 bbl., sand 1,497-1,509 ft.

Loco, Stephens County: Jackson Bros. 3-C Dilley, NE NE NE 7-3s-5w, flowed 250 bbl., sand 1,067-1,115 ft., T.D. 1,119 ft.

Miscellaneous

Creek County: Sinclair Prairie 52 Berryhill, S½ NE NE 16-17n-12e, pumped 15 bbl., sand 1,418-1,588 ft., T.D. 1,590 ft.

Sinclair-Prairie 53 Berryhill, SW NE NE 16-17n-12e, pumped 12 bbl., sand 1,406-1,575 ft., T.D. 1,578 ft.

Hughes County: W. A. Delaney 1 Stanford, SE NE NE 22-6n-8e, pumped 38 bbl., Booch 2,635-50 ft.

F. P. Lonshan 2 Fish, NW SW NE 19-7n-8e, pumped 25 bbl., Calvin 1,321-32 ft.

Burke-Greis 2 Simons, SE NE SE 24-9n-8e, dry, T.D. 4,382 ft., Hunton 4,075 ft., Wilcox 4,335 ft.

Osage County: Denman & Halbert No. 3, NW NE SE 9-28n-11e, pumped 15 bbl., T.D. 996 ft.

Kansas Fields

(Continued from Page 79)

Stark North, Pratt County: Lion Oil Ref. 1 Moeller, NW SW 7-26-11w, flowed 40 bbl. an hr. through ½-in. choke, Viola 4,134-39 ft.

Stoltenberg, Ellsworth County: Gulf 6 Svoboda, SW SE 8-16-10w, pumped 128 bbl., Arbuckle 3,310-30 ft.

Magnolia Pet. 4 Schroeder, SW NE 33-16-10w, pumped 103 bbl., Arbuckle 3,302-20 ft.

Trapp, Russell County: Coralena Oil 4 Sellens, S½ NW SE 19-15-13w, pumped 598 bbl., Arbuckle 3,277-91 ft.

Zenith, Stafford County: Transwestern Oil 1 Krey, SE SE 36-23-11w, flowed 63 bbl. in 1 hr., Viola 3,713-25 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Nebraska Producing & Refining Co. completed 1 D. E. Bohrer in C E½ NW NW of 10-1n-14e, Richardson County, Nebraska, the past week. It was the first new producer this year for the state and it is located in the Dawson pool, the best well of the pool to date. Hunton lime was topped at 2,170 ft. and cement plug was drilled to 2,180 ft. Following acidization with 1,000 gal., 10 bbl. of oil plus 20 per cent water was swabbed an hour, 600 ft. off bottom.

NEBRASKA COMPLETION

Buffalo County: Gled Oil Co. 1 Swenson, NE NE NW 26-12n-17w, dry, T.D. 3,826 ft., elevation 2,167 ft., Dakota 1,404 ft., Dodge 2,885 ft., Kansas City 2,948 ft., Viola 3,575 ft., Simpson 3,616 ft., Arbuckle 3,718 ft.

Equipment Progress

New Insulating Cement Meets Wartime Need

A new noncorrosive insulating cement is announced by Baldwin-Hill Co., Trenton, N. J. It is known as Baldwin-Hill No. 1. A special rust

inhibitor prevents corrosive action, even when allowed to air-dry over a long period of time. Made from high-temperature-resisting B-H black rock wool, it is said to be effective up to 1,800° F. The manufacturer claims that the new product overcomes the troubles associated with other means of insulating metal surfaces, such as moisture in ordinary insulating cement which causes rust which pits the metal and destroys the bond causing the cement to peel and fall.

Plastic Reducing Coupling Aids Tubing Applications

Commercial Plastics Co., 201 North Wells Street, Chicago, announces the new Saran plastic reducing coupling. Its use will greatly increase the applications for tubing systems made of Saran. It further completes the line of Saran fittings for use with Saran tubing.

The Saran reducing coupling is an adaptation of the Saran union coupling. It has the same general characteristics of strength, dependable performance, and long life possessed by other Saran fittings. Reducers are available with ⅛-in. reduction for all sizes of Saran tubing from ¾ in. to ⅛ in.

Fifth Borg-Warner Division Gets "E"

Rockford Drilling Machine Division of Borg-Warner Corp., fifth of the corporation's divisions to be awarded the coveted "E," received the Army-Navy citation for excellence in production in a ceremony in Rockford, Ill., June 2.

Lt. Comdr. W. L. Nunn, Ninth Naval District industrial relations officer, made token "E" pin presentations to G. A. Shallberg, executive vice president of Borg-Warner Corp.; Emil C. Traner, president of Rockford Drilling Machine Division, and employe representatives.

Other Borg-Warner plants that have previously won the "E" for war production are the Spring Division, Chicago; Pump Engineering Service Co., Cleveland; Long Manufacturing Co., Detroit; and Mechanics Universal Joint Division, Rockford.

National Supply Co. Gets Fourth Production Award

National Supply Co. was the recipient of its fourth war-production award on May 19 with the presentation of the Army-Navy "E" to the employes of its Torrance, Calif., plant. The three previous awards consisted of the Army-Navy "E" at the Ambridge, Pa., and Toledo, Ohio, plants, and the U. S. Maritime Commission Victory Fleet Flag and Maritime M Pennant to the Superior Engine Division at Springfield, Ohio.

Presentation of the award was made to Pres. A. E. Walker by Lt. Col. Lawrence C. Ames, A.A.F. Army-Navy "E" pins were presented to Reese James of 43 years' service and to Miss Calista Washburn of one year's service, representing plant employes; and to Miss Georgia Farley of 28 years' service, representing office employes. Pins were accepted in behalf of all employes by A. J. Hetzel, chairman, National Supply Co. Unit O.W.I.U., local 128.

Rear Admiral Jos. R. Defrees, U.S.N. retired, inspector of naval material, Los Angeles district, gave the principal address and paid tribute to the workers and management for their achievements.

Pres. A. E. Walker, National Supply Co., accepting award at Torrance plant ceremonies

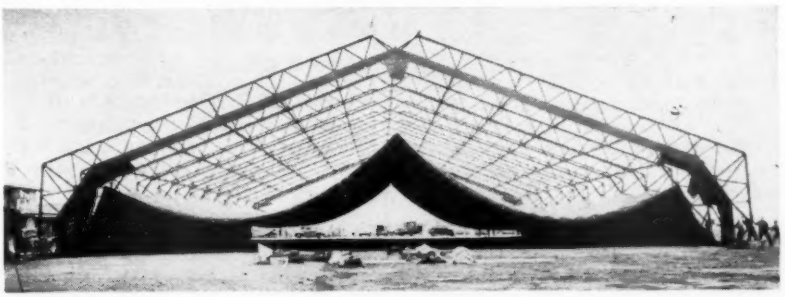
Over 6,000 employes and guests were present at the ceremonies which were broadcast over a nine-station Blue Network hookup from Station KECA. The U. S. Coast Guard Band directed by Rudy Valee was a program highlight.

BUTLER HELPS DEVELOP PORTABLE-TYPE BUILDING

Butler Manufacturing Co., Kansas City, Mo., long a supplier of prefabricated steel buildings in the petroleum industry, has been applying these same skills to the war effort, by assisting in the development of a highly portable type building, such as illustrated here.

This building can be flown to erection site complete in all details, as it is designed to pack in uniform packages occupying the least possible cubage. It can be quickly erected or dismantled by unskilled men. Design provides for a resilient structure that can be easily repaired. For the covering of this building, flameproofed canvas was selected because it was light in weight, can be easily transported by air, and quickly erected.

By actual experience, it has been found that a combat hangar 130 ft. wide by 160 ft. long requires 12 to 18 hours for erection by 90 to 100 men.



New Athey Mobiloader W4-1

Athey Truss Wheel Co., 5631 West Sixty-fifth Street, Chicago, Ill., announces an improved model Athey

Mobiloader which operates with the "Caterpillar" Diesel D4 tractor.

Although simplicity in design is the chief change, the manufacturer states, there are numerous improvements over its predecessor model which has been in the field for 4 years. The new model is said to have increased stability, greater operating range, reduced height to simplify transportation and lower center of gravity. It has a bucket capacity of 1⅛ cu. yd.

Athey Mobiloaders, made in sizes to fit "Caterpillar" D8 and D4 tractors, are characterized by their "straight line" loading action. Digging the load at the front, the outfit travels in reverse to the truck or fill and discharges the material overhead.

Trade Literature

Elgin Softener Corp., Elgin, Ill.— Bulletin 504, "The Inside Story of Boiler-Water Softening." The booklet describes the company's deconcentrator systems for treating and purifying boiler water. It explains the types of impurities found in boiler feed water, how these impurities accumulate, what happens when subjected to boiler temperatures, common causes of boiler scale, sludge, corrosion and carryover, and how to prevent these troubles.

Duff-Norton Manufacturing Co., Pittsburgh, Pa. — A handy 16-page jack-maintenance manual, entitled "Maintenance and Safety Hints," which is designed for users of mechanical jacks. In addition to instruction on proper jack handling, the manual also has a section on the basic types of mechanical jacks—screw and ratchet—how they operate, construction details and descriptions of various parts, together with explanatory diagrams.

Among Equipment Men

Osterstrom Joins Velsicol Corp. as Vice President

R. C. Osterstrom, who for the past 20 years has been connected with Pure Oil Co., resigned in May to accept the position of vice president in charge of manufacturing for Velsicol Corp., 120 East Pearson Street, Chicago. Mr. Osterstrom will divide his time between Chicago and the Velsicol plant at Marshall, Ill.

Mr. Osterstrom's business career has always been in connection with the petroleum industry. After leaving school, he joined Gulf Refining Co. at Bayonne, N. J., and later at Port Arthur, Tex. During the first World War he served in the U. S. Navy on foreign duty. Returning to the United States in 1919, he became affiliated with Sinclair Refining Co. at East Chicago, Ind., as assistant to the chief chemist. In 1923 he joined Pure Oil Co. as chief chemist, subsequently becoming executive assistant to the vice president in charge of manufacturing. Recently, Mr. Osterstrom was located in Toledo, Ohio, as manager of the Pure refinery there.

Velsicol Corp. produces petroleum chemicals and derivatives, including aromatic hydrocarbons, high-solvency naphthas, insecticides, resins, and core oils.

Four Promoted by Bridgeport Brass Co.

AUSTIN R. ZENDER

Four executives of sales department of Bridgeport Brass Co., Bridgeport, Conn., received promotions last month, following a special announcement by Herman W. Steinkraus, president and general manager.

Austin R. Zender has been named to the position of general sales director and A. Dean Merwin has been named director of fabricating sales.

George H. Baldwin will continue to serve in his present capacity as general sales manager of the Mill Products division.

The new general sales director joined the company in 1936 as sales manager of the Condenser Tube division. He worked out of the New York office until 1941, when he was brought to Bridgeport to head the Tube and Pipe Sales division. With the outbreak of the war, he assumed the additional responsibilities of director of priorities. He is a veteran in the copper and brass field, having been in the business for 24 years.

Two field representatives won promotions. George H. Tobelman has been named eastern division manager and Carl J. Quanz, western division manager.

Mr. Tobelman is in charge of the Newark office and will supervise activities in Boston, Providence, New York, Newark, Philadelphia, Detroit, Cleveland, Pittsburgh and Cincinnati.

Mr. Quanz will have charge of the Chicago, Milwaukee, Minneapolis, St. Louis, Houston, Denver, Seattle, San Francisco and Los Angeles branches.

Pennsylvania Salt Appoints New Sales Manager

Pennsylvania Salt Manufacturing Co., Philadelphia, Pa., announces the

FRED G. PRINCE

CHARLES M. FEHR

appointment of Fred Prince, for the past 3 years manager of its laundry and dry-cleaning division, as manager of sales. He will be in charge of sales of hydrofluoric acid and anhydrous hydrogen fluoride, as well as several of the company's other chemical products, and he will retain jurisdiction over the laundry and dry-cleaning division. Mr. Prince joined the company about 3 years ago when it purchased Sterling Products Co., of Easton, Pa., of which he was vice president and sales manager. He is, therefore, thoroughly familiar with the development of anhydrous hydrogen fluoride at the Easton plant.

Charles M. Fehr, formerly chief chemist at the Easton plant, has been transferred to Philadelphia to assist Mr. Prince in the sale and servicing of anhydrous hydrogen fluoride to the oil industry. As former chief chemist of the old Sterling company, he was intimately concerned with the development of this product from its inception. He is spending much of his time in the field with oil men who are interested in the use of this new and important catalytic cracking agent for 100-octane gasoline.

Classified Advertising

EQUIPMENT FOR SALE

FOR SALE — 72 Beaird Steel Headers, 4" I.D., 2000 lbs. test press.; 30 Brewster Steel Headers, 4" I.D., 3000 lbs. test press.; 30 B.W.Y. C.R. Steel Headers, 4" I.D., High Pressure. ARROW PETROLEUM CO., Centralia, Ill.

FOR SALE: 3 Complete Power Rotary Drilling Rigs with approximately 7000 feet 3½" OD Drill Pipe and 12,000 feet of 4½" OD Drill Pipe. All Waukesha, Butane equipped Motors and Gardner-Denver 14 pumps. These rigs are all running and in good condition. Box 331, Carmi, Illinois.

1—60 HP HRT Boiler
1—200 HP Water Tube Boiler
All Sizes Oil Country Boilers
25,000 Feet New 4" OD 14 Gauge Buttweld Steel Tubing
LUCEY PRODUCTS CORPORATION
Tulsa, Oklahoma

80,000 Bbl. Tank

All steel, cut down, rivets backed out and match marked. Ready for loading. Located Sunburst, Montana. Guaranteed A-1 condition in every respect.

Also 4—55,000 Bbl.

5 ring all steel tanks located in Okla. A-1 condition.

1—37,500 Bbl.

all-steel storage tank. Located El Dorado, Kansas. Offer as is, where is, or dismantled, match marked and loaded.

REFINERY EQUIPMENT, INC.
Union Ave. at 21st St. Tulsa, Okla.

FOR SALE
1—CP 10 x 17 x 10 Type O-CSD Steam Driven Compressor, $750.00.
1—37½ FM Semi-Diesel Oil Engine with extra heavy Fly Wheels, $650.00.
2—75 HP Superior Commercial OF Type Single Cylinder Gas Engine with Clutches, each, $500.00.
1—15 HP Superior Gas Engine, $75.00.
2—18 x 5 x 18 National Transit Horizontal DPP Steam Pump, each $750.00.
1—60 ton Elmes Portable Horizontal Hydraulic press, $250.00.
Cities Service Oil Co., Patridge, Bartlesville, Okla.

RIVER CLAMPS

225 sets to fit 8" line pipe. These are in first class condition ready for immediate inspection.

SOUTH TEXAS PIPE & SUPPLY CO.
Box 476 Corpus Christi, Texas

FOR SALE
1—Bucyrus-Erie, 44L, cable tool well machine equipped with 160 HP Hercules diesel engine. Machine skid mounted. In good order.
J. P. MILLER ARTESIAN WELL CO.
Box 359 Brookfield, Ill.

FOR SALE
ONE MILLION POUNDS

3" Standard Black, Buttweld Pipe, a new, first quality grade; approx. 30% in lengths of 42" to 72"; approx. 70% in lengths of 6' to 13'. Real "blue ribbon" material throughout, free of any rust or pit marks. Also several thousand new, railroad fittings, consisting of flanges, etc. Available for immediate shipment. Will sell all or any part.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards
St. Clair Co., Illinois

EQUIPMENT FOR SALE

FOR SALE: Steel Building near Crane, Texas. Standard Butler building with steel framework, size 36' x 140' x 10'. Eleven revolving-type ventilators, twenty-six windows, six doors. Cities Service Oil Company (Pennsylvania), Houston, Texas.

EQUIPMENT WANTED

WANTED
Used storage tanks:
Pressure Tanks:
All sizes
Send us your list.
SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

WANTED
Used Internal Combustion Engine Powered Mechanical Rotary Drilling Rigs.
LUCEY PRODUCTS CORPORATION
Tulsa, Okla.

WANTED: Power Line Pump, 800 to 1,000# Pressure. Must be in good condition and reasonable. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

WANTED: Two welded drum, 30" to 36" diameter by 12' to 15' long by 1" to 1¼" thick; 1 Drum 24" x 32' x ⅝" to ¾" Shell; and 5 Close clearance Hi-Vol Union (or equal) pumps as follows: 2—6½" x 3" x 8"; 2—6" x 5" x 12"; 1—14" x 3" x 14". Box B-687, The Oil and Gas Journal, Tulsa, Okla.

WANTED
Used Structural Steel
Pipe — Valves
Fittings
Send us your list
SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

TANKS WANTED
Will Buy 6—20,000 Gal. Cap. or other Sizes 10,000 to 25,000 Gal. Cap. to Total 120,000 Gal. Cap.
THE DARIEN CORPORATION
49 East 41st St. New York, N. Y.
Tel.—Murray Hill 2-0042

STEEL TANKS WANTED
4—2250 bbl. 3—1000 bbl.
2—3000 bbl. 1—15000 bbl.
State if welded or riveted.
THE W. H. DYER COMPANY
Fullerton Bldg. (1), St. Louis, Mo

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

WANTED

COMPLETE Plants, Pipe-Lines, and Industrial Enterprises bought for cash or liquidated for the owners. Wire, phone, or write—INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 1044 Canal Bldg., New Orleans, La.—MA 5586.

ROYALTIES

SACRIFICE undrilled royalties in Texas William C. Schultz, Gassville, Ark.

FOR SALE—MAPS

SO. GEORGIA MAPS
Where Majors are leasing.
McINTOSH BROS. or
C. W. DEMING, WAYCROSS, GA.

LEGAL BLANK

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

THE BURKHART LINE of Legal Blanks Since 1908. Oil-Gas and Business Forms for Mid-Cont. and Illinois Basin. Leases Rev. with Gov.'s Regulations. Catalog and Samples. Burkhart Ptg. & Sta. Co., 115 So. Cincinnati, Tulsa, Okla.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

Crude-Oil Prices

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.98
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80			
19-19.9	.84		$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9		1.07	1.30	.94
32-32.9		1.09	1.32	.96
33-33.9		1.11	1.34	.98
34-34.9		1.13	1.36	1.00
35-35.9		1.15	1.38	1.02
36-36.9		1.17	1.40	1.04
37-37.9		1.19	1.42	1.06
38-38.9		1.21	1.44	1.08
39-39.9		1.23	1.46	1.10
40 and above		1.25	1.48	1.12

*Includes Lea County, New Mexico

LEGAL

U. S. DEPARTMENT OF THE INTERIOR. District Land Office, Las Cruces, New Mexico. Notice is hereby given that the S½ NW¼ sec. 9, T. 22 S., R. 37 E., N.M.P.M., New Mexico, 80 acres of land in the Penrose-Hardy oil and gas field, is offered as one parcel to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the act of February 25, 1920 (41 Stat. 437), as amended, at the royalty rate scale in the lease form in General Land Office Circular 1386, at a sale to be held in the district land office at Las Cruces, New Mexico, at 10 o'clock a.m. on July 28, 1943. The successful bidder must deposit on the date of the sale a certified check on a solvent bank, or cash, for one-fifth of the amount of his bid, and file a showing of qualifications to receive the lease as required by section 7 of Circular 1386. The remaining four-fifths, together with the annual rental in advance at the rate of $1 per acre, must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

Journalisms:

RUSSIAN investigators have added greatly to our knowledge of the chemistry of petroleum. They have pioneered in many processes and many of the results have been made available to the American oil industry through the pages of The Oil and Gas Journal in cooperation with the Petroleum Division of the American Chemical Society and the Foreign Petroleum Literature Survey of Universal Oil Products Co. The latest contribution, scheduled to appear in an early issue of the Journal is "Polymerization of Olefins and Diolefins in the Presence of Metallic Sodium." by V. N. L'vov.

AS the nation's producing oil fields become older, the intrusion of water increases. An article which will appear in the near future in the Journal will describe an installation through which cut oil is transported several miles to a treating plant whose action is so nearly automatic that it can be run by a single pumper.

INCREASING quantities of water not only involve added lifting and treating costs but they also cause rapid corrosion of casing. This is particulary true in Kansas where there are several sources of corrosive water. New wells are drilled with these conditions in mind but some of the older wells are badly in need of repair. How this problem is handled is the subject of a staff article to appear in next week's Engineering and Operating Section.

SALT is found in large quantities in many crudes in solution in water-in-oil emulsions as well as in the form of crystals suspended in the oil. If this salt gets into the refinery it causes rapid corrosion of equipment and expensive shutdown for repairs. Methods for removing the salt and for determining the salt content of crude will be described in an article soon to appear in the Journal.

AN added contribution to the discussion of "the shape of things to come" is reported this week in the account of the Interstate Oil Compact Commission meeting. The Journal has presented articles on possible substitutes for liquid petroleum as a means of acquainting its readers with future possibilities as well as the price levels at which oil will encounter competition. According to some observers the ceiling on oil prices placed by competitive sources is quite low, provided labor and steel are available to place these competitive materials on the market. The present refinery price range for gasoline is 5 to 6½ cents and the estimated cost of gasoline from substitutes is as follows:

From shale oil—5 to 12 cents.

Fischer-Tropsch method from gas—9 to 12 cents.

Ten per cent alcohol blend—10 cents

Hydrogenation of coal—16 cents.

Fischer-Tropsch method from coal—18 cents.

Reserves of oil in shale are estimated to be five times as great as the remaining oil reserve. The tonnage of coal reserves is about 2,000 times as great as that of our known oil reserves. The investment per daily barrel of motor gasoline from crude has been placed at $2,500 while the equivalent investment for oil from shale is estimated at from $1,500 to $3,000. Shale oil provides more chemical by-products than crude.

AT what depth does the pressure of overlying formations cause porous beds to collapse, thereby reducing their porosity to zero? What happens in case such beds contain oil? Next week's issue will include a discussion of this problem whose solution sets the depth below which oil fields cannot be found.

CALENDAR

July

PETROLEUM INDUSTRY WAR COUNCIL, regular meeting, Washington, D. C., July 14.

KENTUCKY OIL AND GAS ASSOCIATION, annual midyear meeting, Ashland, Ky., July 24.

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10. Place of meeting not yet determined.

October

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

ADVERTISERS IN THIS ISSUE

Air Reduction Sales Co.	1
Airetool Mfg. Co.	83
American Brass Co., The	47
American Cable Division of American Chain & Cable Co., Inc.	Inside Back Cover
American Cast Iron Pipe Co.	79
American Roller Bearing Co.	75
Axelson Manufacturing Company	54
Barret, Inc., William M.	84
Big Four Machine and Supply Co.	80
Brewster Company, The	84
Briggs Clarifier Co.	4
Bucyrus-Erie Co.	76
Cardwell Mfg. Co., Inc.	84
Cast Iron Pipe Research Association, The	38
Chapman Valve Mfg. Co., The	8
Classified Advertising	93-94-95
Climax Engineering Co.	88
Cooper-Bessemer Corp., The	44-45
Crutcher-Rolfs-Cummings	66
Darling Valve & Mfg. Co.	2
Diamond Chain & Mfg. Co.	48-A
Dravo Corporation	83
Economy Electric Lantern Co.	83
Fluor Corporation, Ltd., The	Front Cover
Formica Insulation Co., The	81
General American Transportation Corporation—Terminal Division	6
Grancell, I. H.	85
Gray Tool Company	56
Greenspon's Son Pipe Corp., Jos.	82
Grizzly Mfg. Co.	73
Hughes Tool Co.	Back Cover
International Nickel Company, Inc., The	10
Keuffel & Esser Co.	79
Larkin Packer Company, Inc.	35
Lunkenheimer Co., The	67
McCord Radiator & Mfg. Co.	66
McCullough Tool Co.	5
McNamar Boiler & Tank Co.	82
Midwest Piping & Supply Company, Inc., The	42
Mid-West Printing Co.	82
National Transit Pump & Machine Co.	7
Oakite Products, Inc.	80
Patterson-Ballagh Corporation	65
Penberthy Injector Co.	12
Pittsburgh Equitable Meter Co.	Inside Front Cover
Plant Rubber & Asbestos Co.	9
Pritchard & Co., J. F.	39
Products Mfg. Co.	85
Reed Roller Bit Company	41
Reilly Tar & Chemical	65
Ryerson & Son, Inc., Joseph T.	62
Seismograph Service Corp.	48-D
Shand & Jurs Co.	3
Texas Pipe Bending Co.	82
Thomas Flexible Coupling Co.	77
Thornhill-Craver Co.	84
Universal Oil Products Co.	37
Wellman Co., The S. K.	74
Wheatley Pump & Valve Mfgrs.	65
Wolverine Tube Division	51